E

OLYMPUS
OM-PC

OM-PC is the model name for U.S.A. and CANADA
Repair parts only for OM-40 are not
supplied to U.S.A. and CANADA

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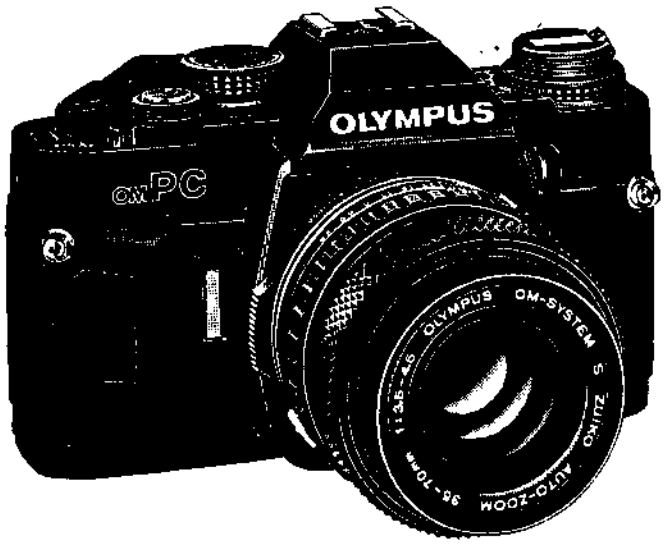


OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

A

GENERAL OUTLINE

A. GENERAL OUTLINE

1. Outline of Product

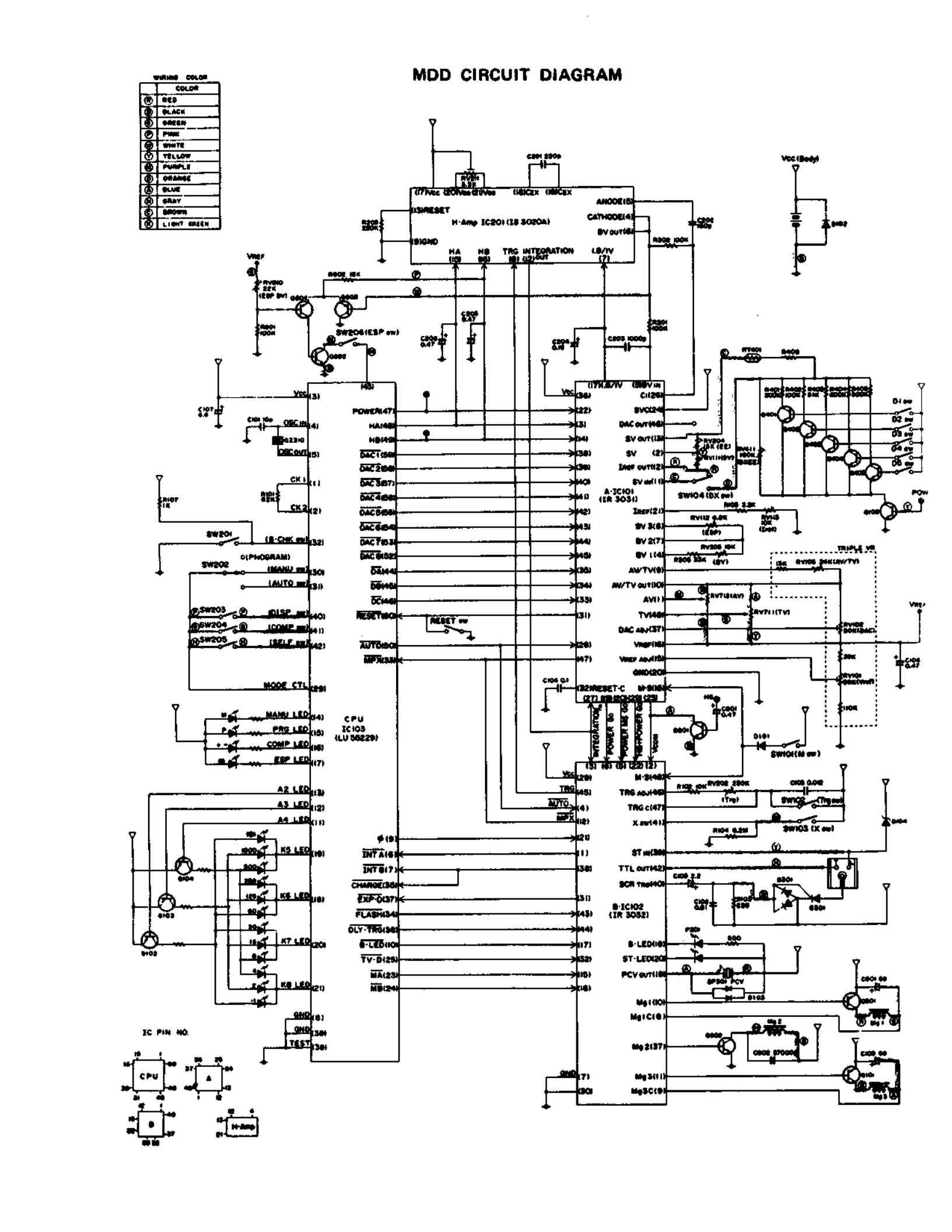
Model name	:	OLYMPUS OM-40 (OM-PC for North America)
House code	:	MDD

2. Main Specifications

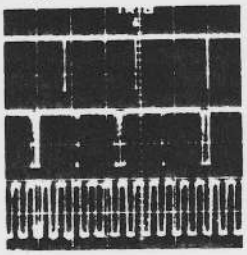
Type	:	TTL auto-exposure 35mm single lens reflex camera
Film format	:	24mm X 36mm, 35mm standard cassette
Lens mount	:	Olympus OM mount
Shutter	:	Electromagnetically controlled focal plane shutter with holizontally travelling cloth curtain
Synchronization	:	X contact (synchronization at speeds of 1/60 sec. or slower) Direct hot shoe contact with OM T series electronic flash system
Light measuring method	:	Olympus type light measurement in camera body (light measurement in mirror box) SBC photosensor
Light measuring pattern	:	ESP (Electro-Selective Pattern) metering and Center-weighted averaged metering
Exposure mode	:	Program Auto, Aperture preferred Auto and Manual Exposure
Automatic exposure control by program	:	(Type) Automatic aperture control electronic shutter by TTL direct light measurement (Range) 2 - 1/1000 sec (0 - 18EV at ISO 100, 50mm F 1.4) (Flash control) In combination with T-series flash, aperture automatically controlled by a program for flashing at speeds lower than 1/60 sec. (Other than T-series flash, flashing at all shutter speeds).
Aperture preferred automatic exposure control	:	(Type) TTL direct light measuring with aperture-preferred electronic shutter (Range) 2 - 1/1000 sec (0 - 18EV at ISO 100, 50mm F 1.4) (Flash control) In combination with T-series flash, flashing at speeds of 1/60 sec or slower (other than T-series flash, flashing at all shutter speeds).
Manual exposure control	:	B, 1 - 1/1000 sec (all speeds are controled by electronic shutter) To obtain the proper exposure, set the shutter dial to the setting indicated in the viewfinder (Flash control) Synchronized with flash at speeds of 1/60 sec and slower (flashing at all shutter speeds)
Exposure compensation	:	±2EV in 1/3 stop increments (exposure compensation is not possible in the auto-set film speed mode) (compensation degree limited depending on ISO levels)
Film sensitivity	:	ISO 25 - 3200 Selection of automatic setting for DX coded films, or manual setting Auto setting: ISO dial to DX ISO AUTO SET Manual setting: Lifting and rotating ISO dial

Viewfinder	:	Pentaprism eye-level type Finder view-field: 93% Finder magnification: 0.92X with 50mm lens at infinity Diopter of finder: - 0.5 diop. Focusing screen: fixed type bright Lumi-Micron Matte with central microprism/ split image
View finder information	:	LED multi-mode display 1) Shutter speed 1 - 1000 (green) lights 2) Over exposure warning "1000" (green) blinks 3) Under exposure warning "1▼" (green) lights 4) Exposure mode: Program --- "P" (green) lights Manual --- "M" (orange) lights no mode indication in Aperture preferred auto mode 5) Insufficient stop down in program mode "⊡" (red) and "1000" (green) blink mutually 6) Exposure compensation "+, —" (orange) blinks 7) ES Pattern light measurment "⊡" (green) lights 8) Completion of flash charging "ϟ" (green) lights 9) Correct flash exposure confirmation "ϟ" (green) blinks
Viewfinder information switches:		Viewfinder information is indicated for 60 sec. by the following operations 1) Depressing the release button slightly 2) Turning mode selector knob 3) Releasing shutter (for updating only) 4) (Indication lasts while flash power switch is kept ON)
Mirror	:	Multi-coated large quick return mirror
Film loading	:	Easy loading
Film advance	:	Film advance lever with 130° angle for one long or several short strokes and pre-advance angle 30° ; motor drive and winder usable
Film rewind	:	Rewind crank Sprocket released by depressing the push button on top of the camera body and automatically reset
Film frame counter	:	Sequential addition type, automatically reset
Self-timer	:	12 sec delay electronic self-timer Setting by lever (automatically cancelled by film advance; self-timer mode remains, if wind the film in several short strokes.) Audio-visual LED and PCV indications
Battery check	:	Rotating mode selector knob, automatically reset 3-level display with LED and PCV
Accessory shoe	:	Fixed type with direct contact
Grip	:	Large elastic grip on front and rear of camera with non-slip texture
Back cover	:	Fixed type with film window
Battery	:	2 x SR-44 or 2 X LR-44
Dimentions	:	135.5 (W) x 86 (H) x 53 mm (5.33" x 3.39" x 2.09") (Body only)
Weight	:	470 g

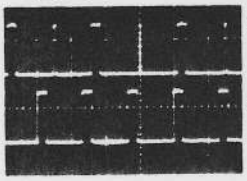
MDD CIRCUIT DIAGRAM



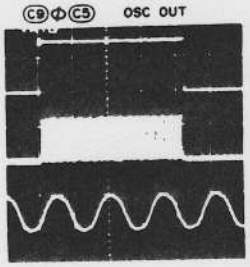
(C2) CK2



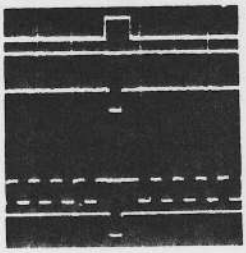
(C47) POWER



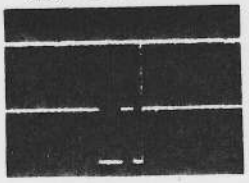
(C9) Φ (C5) OSC OUT



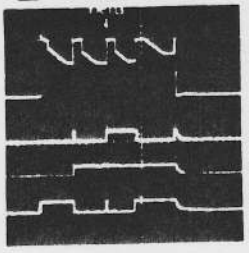
(C48) HA (C49) HB



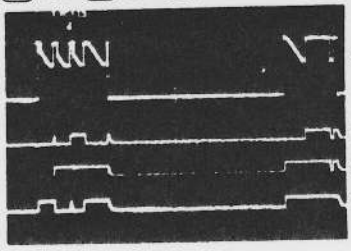
(C29) MODE CTL



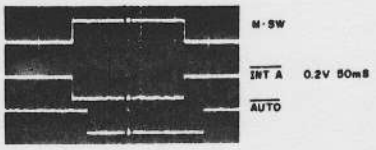
(C44) $\overline{DA}$ (C45) $\overline{DB}$ (C46) $\overline{DC}$ (ESP OFF, MANU)



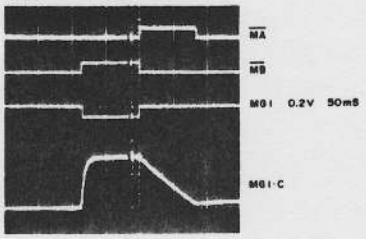
(C44) $\overline{DA}$ (C45) $\overline{DB}$ (C46) $\overline{DC}$ (ESP ON, MANU)



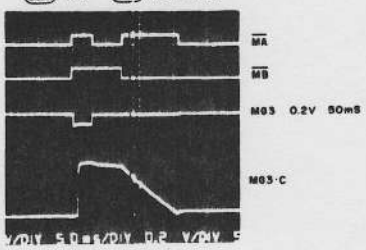
(C6) $\overline{INT\ A}$ (AUTO)



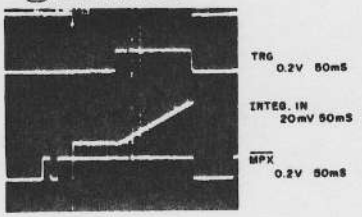
(C23) $\overline{MA}$ (C24) $\overline{MB}$ (AUTO)



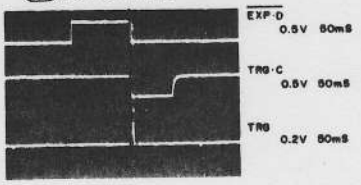
(C23) $\overline{MA}$ (C24) $\overline{MB}$ (PRGM)



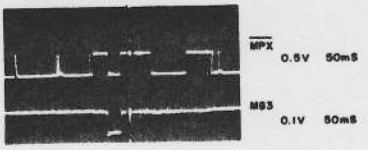
(C3) INTEG. IN (AUTO)



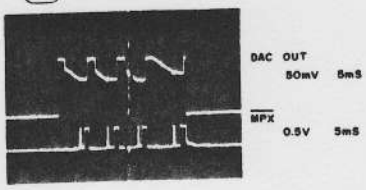
(C37) $\overline{EXP\cdot D}$ (AUTO)



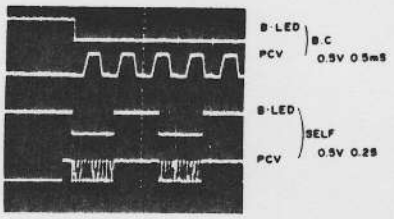
(A47) $\overline{MPX}$ (PRGM)



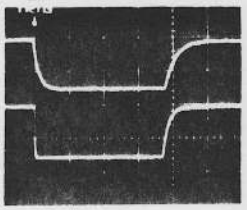
(A47) $\overline{MPX}$ (MANU)



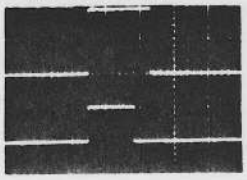
(B18) B·LED (B19) PCV OUT



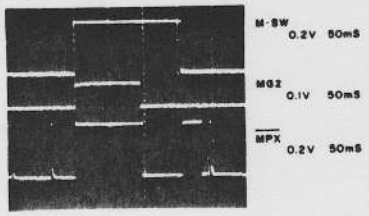
(B47) TRG·C (AUTO)



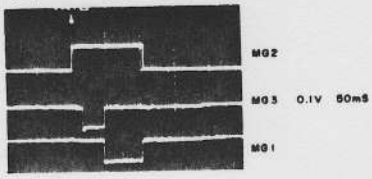
(B2) VCOM (AUTO)



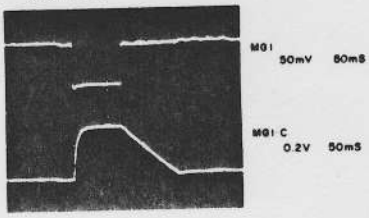
(B37) MG2 (AUTO)



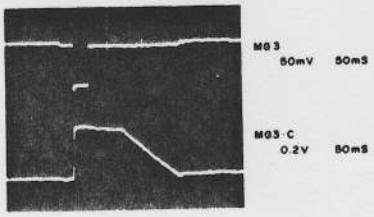
(B37) MG2 (B11) MG3 (B10) MG1 (PRGM)



(B8) MG1·C



(B9) MG3·C (PRGM)



A 00	BIPOLAR A PIN NO.
B 00	BIPOLAR B PIN NO.
C 00	CPU PIN NO.
H 00	HEAD AMP. PIN NO.

ADJ. OF M5 CIRCUIT BOARD

MODE : TEST MODE

Iref adj
ISO 3200

T. M.	14	16	18	20	22	24	26	28	°C
Iref	125.8	126.7	127.6	128.5	129.4	130.2	131.1	131.9	mV

- CHECK VOLTAGE BETWEEN SVIN and SV
- ADJ BY RV113

TV/AV adj
ISO 100

T. M.	14	16	18	20	22	24	26	28	°C
TV/AV	197.3	198.7	200.1	201.5	202.9	204.2	205.6	207.0	mV

- CHECK VOLTAGE BETWEEN Vref and AV OUT
- ADJ BY RV103

DAC adj
ISO 100

T. M.	14	16	18	20	22	24	26	28	°C
DAC	188.8	190.1	191.4	192.7	194.0	195.4	196.7	198.0	mV

- CHECK VOLTAGE BETWEEN Vref and DAC OUT
- ADJ BY RV102

ESP adj
BV12
F 5.6
ISO 3200

WHEN ESP SW is OFF
- CHECK VOLTAGE BETWEEN Vref and BV3
  216.6 ± 1mV
- ADJ BY RV203

WHEN ESP SW is ON
- CHECK VOLTAGE BETWEEN Vref and BV3
  WITH IN ± 1mV BASED ON ESP SW-OFF
- ADJ BY RV112

VCOM

- ISO 100 200mV
- ISO 400 50~60mV
- CHECK VOLTAGE BETWEEN Vref and VCOM
- ADJ BY RV204

VOLTAGE

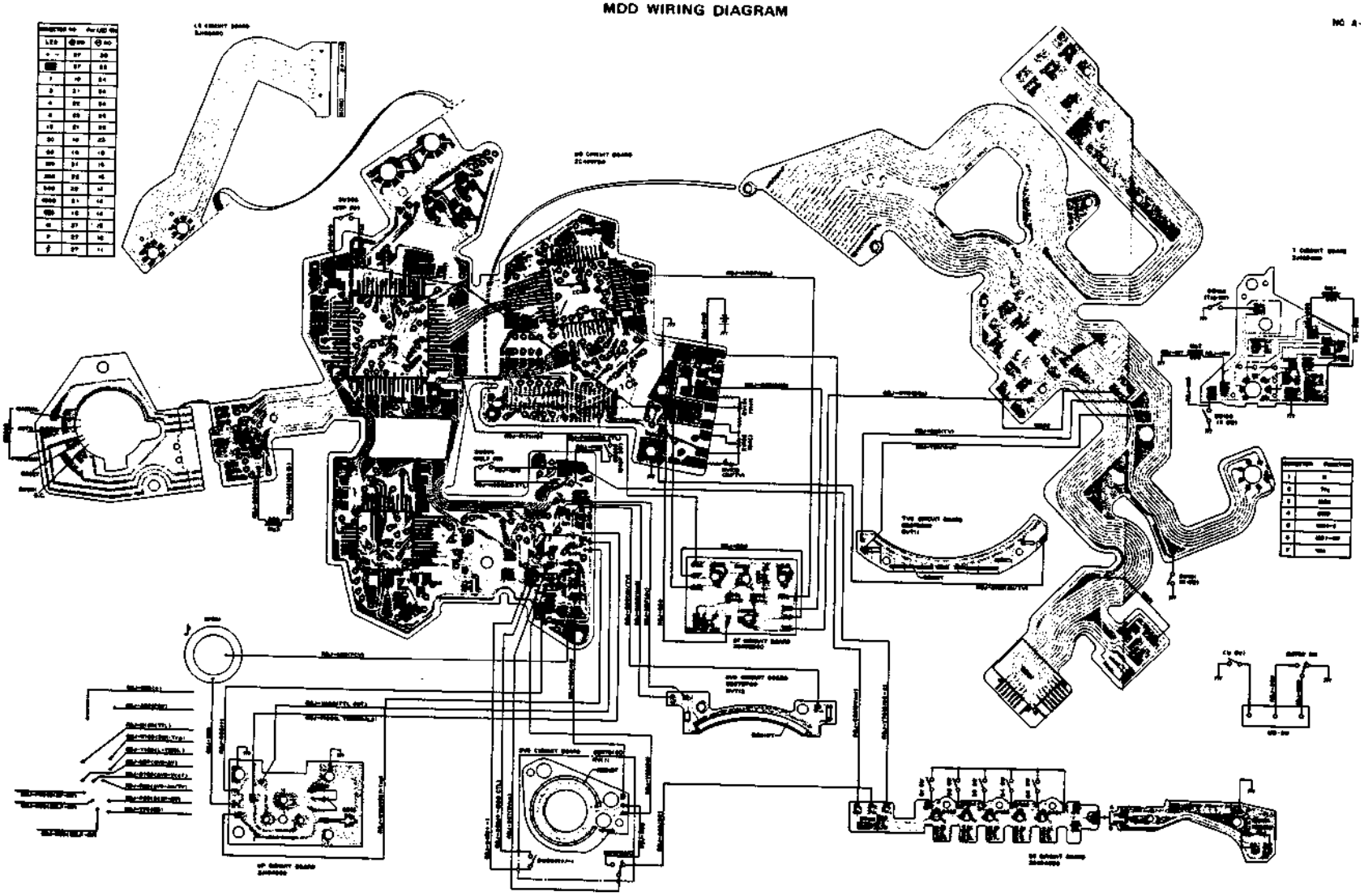
MODE : B.C.

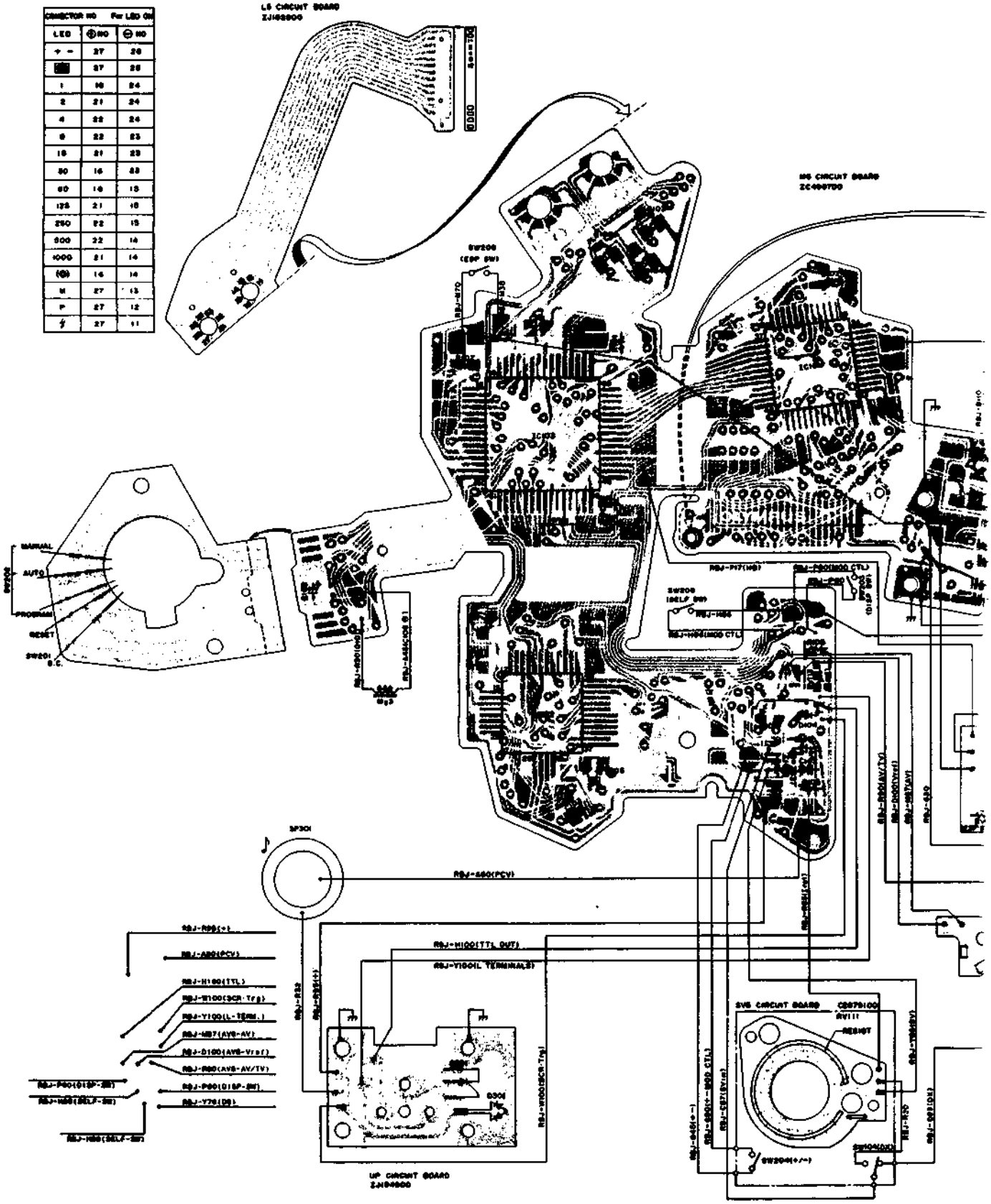
SV 126 mV	○ ISO 100 ○ SVIN - SV (⑪-⑫)	
BV1 -960 mV	○ ISO 100 ○ Vref - BV1	
BV2 -630 mV	○ ISO 100 ○ Vref - BV2	
BV3	○ ISO 100 ○ ESP SW-OFF ○ Vref - BV3 ○ -600mV	○ ISO 100 ○ ESP SW-ON ○ Vref - BV3 ○ -608mV
AV	○ ISO 100 ○ F1.8 (MS5018) ○ 132mV	○ ISO 100 ○ F16 (MS5018) ○ 6mV
TV	○ ISO 100 ○ 1/1 ○ 183mV	○ ISO 100 ○ 1/1000 ○ 3mV

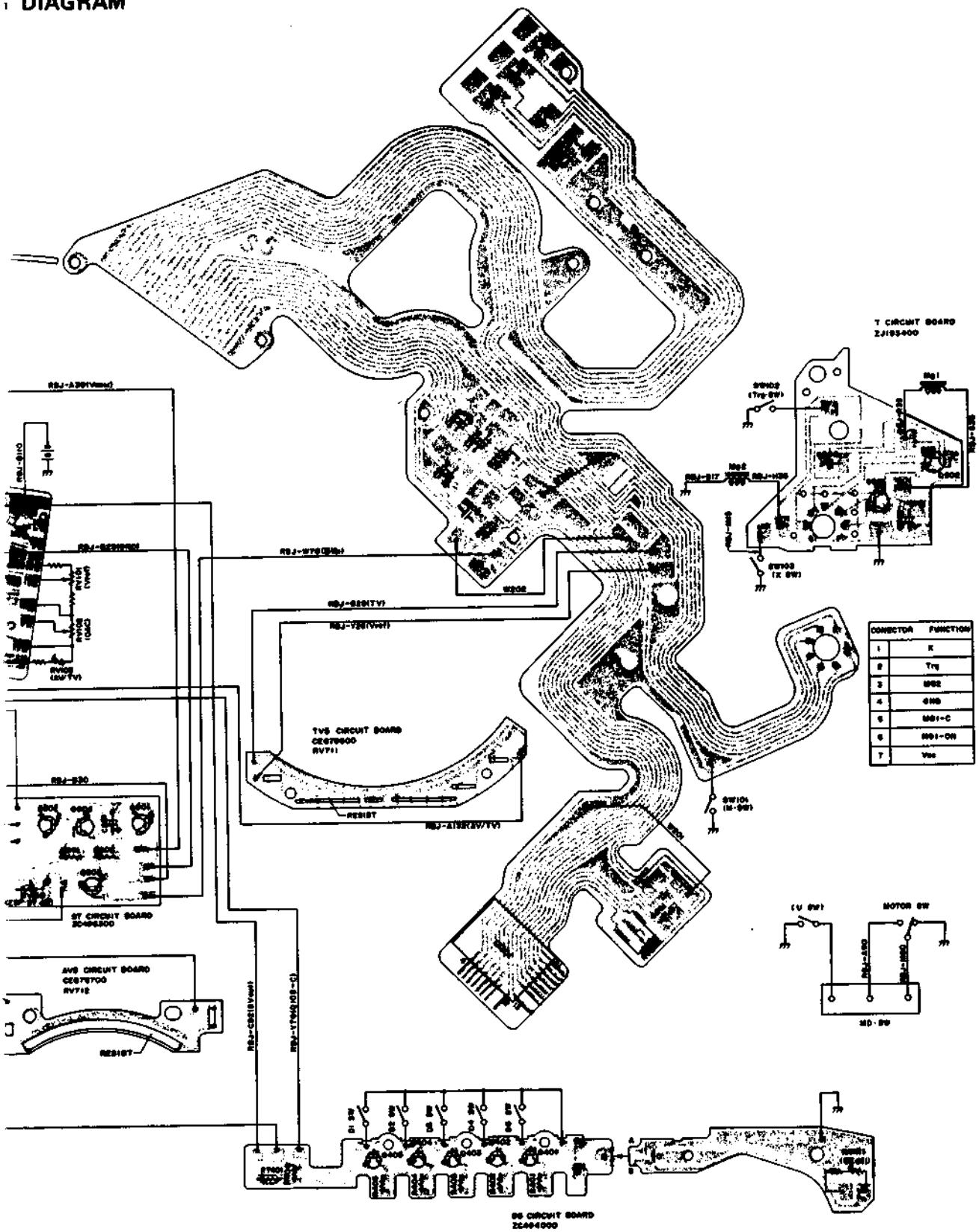
PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
IC101	DI157500	BIPOLA A	RT401	DR667700	1.8K
IC102	DI155500	BIPOLA B			
IC103	DI155600	CPU	RV101	DR662500	Vref adj
			RV102	〃	DAC adj
IC201	DI140200	HAD AMP	RV103	〃	AV/TV adj
			RV111	CE879100	SV5 CIRCUIT
Q101	DS149000	2SB736-TI	RV112	DR637500	ESP adj
Q102	DS148800	2SA1344-TB	RV113	DR647300	Iref adj
Q103	〃	〃			
Q104	〃	〃	RV202	DR667900	Trg adj
Q105	DS148900	2SC3398-TB	RV203	〃	BV adj
			RV204	〃	EE adj
Q301	DS114400	CR03AM-12			
			RV411	DR667800	DX EE adj
Q401	DS148400	2SC3397			
Q402	〃	〃	RV711	CE878600	TV5 CIRCUIT
Q403	〃	〃	RV712	CE878700	AV5 CIRCUIT
Q404	〃	〃			
Q405	〃	〃	RV810	DR673900	22K ESP BV adj
Q501	DS114200	2SB736	C101	DC442800	10pF 25V
Q502	DS114300	2SC1653	C102	DC442900	0.01μF 25V
			C103	DC443100	0.012μF 25V
Q801	DS148400	2SC3397	C104	DC443000	0.1μF 15V
Q802	〃	〃	C106	DC442300	0.47μF 20V
Q803	DS149000	2SB736-TI	C107	DC442400	6.8μF 6.3V
Q804	〃	〃	C108	DC361900	68μF 4V
			C105	DC444200	2.2μF 3.15V
D101	DS149200	IS2836-TI	C201	DC443200	220pF 25V
D102	〃	〃	C202	DC443300	150pF 25V
D103	〃	〃	C203	DC449700	1000pF 25V
D104	DS149300	RD62MB-TI	C204	DC442500	0.15μF 35V
			C205	DC442300	0.47μF 20V
D301	DS085900	IS953 NEC			
			C501	DC361900	68μF 4V
R101	DR665200	82K	C502	DC444500	0.027μF 25V
R102	DR665300	10K			
R103	DR665400	220	C801	DC442300	0.47μF 20V
R104	DR665500	8.2M			
R105	DR665600	2.2K	P201	DQ039400	LED
R107	DR665800	1K			
			QZ310	DF016700	QUARTZ
R201	DR665900	100K			
R202	〃	〃	SP301	ZC494300	KBS-200A-7L-67 PCV
R203	DR666000	220K			
R205	DR677200	30K			
R401		200K			
R402		100K			
R403		51K			
R404		600K			
R405		300K			
R406		82K			
R801	DR673700	100K			
R802	DR673800	15K			

MDD WIRING DIAGRAM




CONNECTOR NO
For LED ON
LED
⊕NO
⊖NO
L6 CIRCUIT BOARD
ZJ-66900
M6 CIRCUIT BOARD
ZC-66870D
SW206
(EDF SW)
SW205
(SELF SW)
MANUAL
AUTO
PROGRAM
RESET
SW201
S.C.
SP301
RBJ-660(PCV)
RBJ-H100(TTL OUT)
RBJ-Y100(L TERMINAL)
SVS CIRCUIT BOARD
CD-79100
AV(1)
RESET
UP CIRCUIT BOARD
ZJ-64900


T CIRCUIT BOARD
ZJ193400
TVS CIRCUIT BOARD
CE679500
RV711
RESIST
ST CIRCUIT BOARD
AVS CIRCUIT BOARD
CE679700
RV712
RESIST
SS CIRCUIT BOARD
ZZ404000
MOTOR SW
MD-SW
CONNECTOR
FUNCTION
1 R
2 TV
3 GND
4 GND
5 MD1-C
6 MD1-ON
7 Vss

B

INSPECTION STANDARDS

B. INSPECTION STANDARDS

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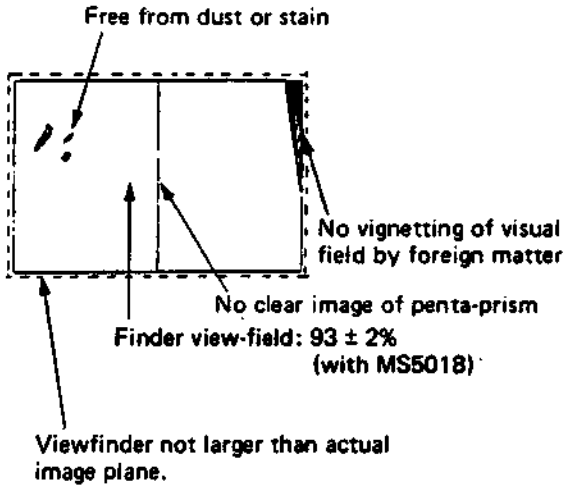
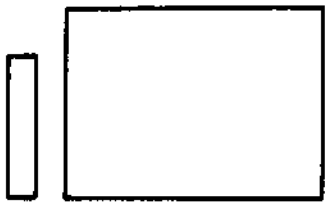
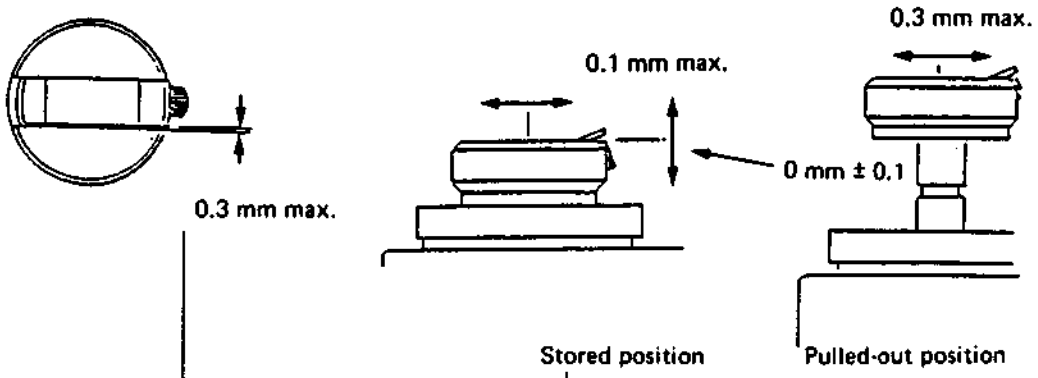
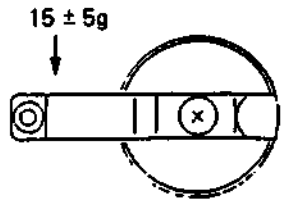
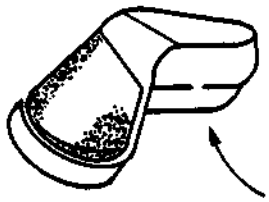
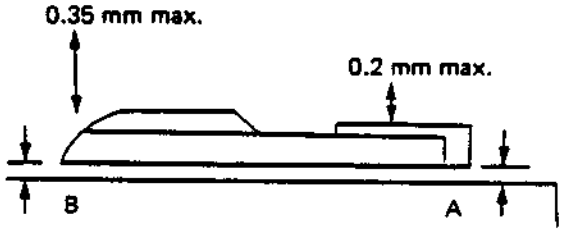
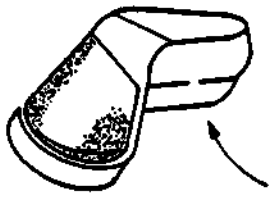
B. INSPECTION STANDARDS

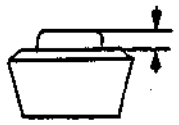
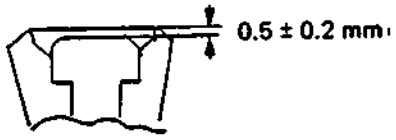
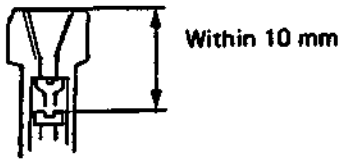
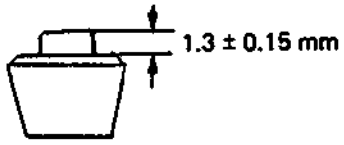
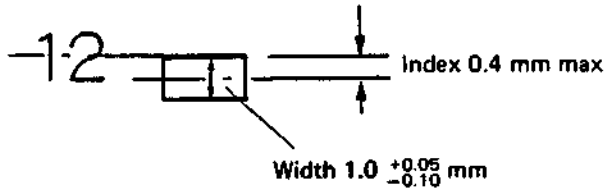
I. APPEARANCE AND FUNCTIONS

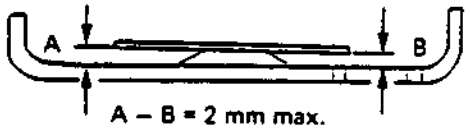
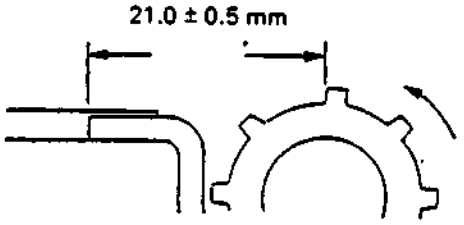
Major check point	Item to be checked	Standard and check procedure
1. View finder	1) Visual field	
	2) Diopter of viewfinder	$-0.5^{+0.1}_{-0.2}$ diop
2. Indication in the viewfinder	1) Exposure indicating position	 • No remarkable inclination or deviation of the indicator mask from the mask surface. • No remarkable inclination of indicator segment relative to the mask, vignetting or deviation. • No eneven thinning or inclination of character in the segment.
	2) Start of indication	Indication must start upon the following operation: 1. Turning mode selector knob 2. Depressing release button at its first stage 3. Flash power switch ON (T-series flash)
	3) Extinguishment of indication	Indication must be extinguished upon the following operation: 1. 60 ± 10 sec. 2. Shutter dial set at "B" (in manual mode) 3. Battery voltage lower than the locked level 4. Removal of battery 5. During exposure

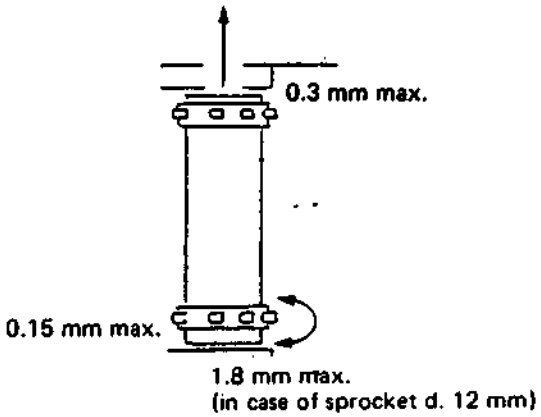
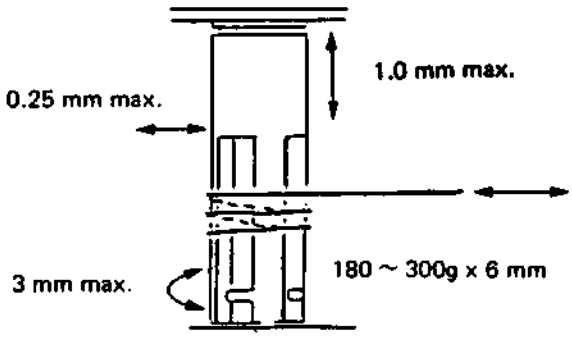
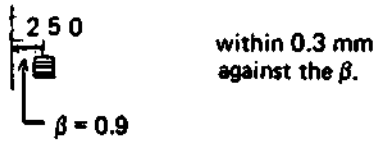
Major check point	Item to be checked	Standard and check procedure
		(Display time must be renewed by the following operation) 1. Battery check mode 2. Shutter operation 3. Flash power switch ON (T-series flash) * Indication lasts while flash power switch is kept ON * Indication is not updated when a switch is kept depressed continuously
	4) OVER indication	The indication "1000" must blink to warn over exposure when shutter speed exceeds 1/1000 sec.
	5) Indication error	Exposure indication must-not differ upon switching between Auto and Manual. Indication must be steady by tilting the camera in either direction.
	6) Colour of indications	Shutter speed indications 1▼~ 1000 green ESP metering mark green Program mode mark P green Manual mode mark M orange Exposure compensation mark +— orange Stop down mark (⊛) red
3. Indication in Programmed automatic exposure mode	1) Indication reliability	"P" must be indicated upon switching mode. Suitable exposure level must be indicated as shutter speed. (Shutter speed is indicated by LED in 1EV steps)
	2) OVER indication	"1000" LED blinks when shutter speed exceeds 1/1000 sec. with the stop ring set at minimum aperture position. "1000" and " (⊛) " marks blink alternately when shutter speed exceeds 1/1000 sec. with the stop ring set at a position other than minimum aperture.
4. Indication in Auto exposure mode	1) Indication reliability	Upon mode switching, a shutter speed for suitable exposure level is indicated by LED (in 1EV steps).
	2) OVER indication	"1000" LED blinks when shutter speed exceeds 1/1000 sec.
5. Indication in Manual exposure mode	1) Indication reliability	"M" must be indicated upon switching mode. Suitable exposure level must be indicated as shutter speed. (Shutter speed is indicated by LED in 1EV steps)
	2) OVER indication	"1000" LED blinks when shutter speed exceeds 1/1000 sec.

Major check point	Item to be checked	Standard and check procedure
6. Indication for Exposure compensation	1) Indication reliability	"+–" mark must blink when exposure compensation dial is set at a position other than 0. Shutter speed indication must respond to exposure compensation. "+–" mark must not blink when ISO dial is set at DX ISO AUTO SET.
7. Indication for ESP metering	1) Indication reliability	"[ESP]" mark must be indicated upon switching ESP mode. (When the whole composition is illuminated evenly the camera operates in the center weighted average metering. In this case the ESP metering mark does not appear).
8. R knob	1) Operation reliability	The knob must be pulled out in two stages. When it is pulled up further from the 2nd stage and then released, it must be set automatically at the 2nd stage.
	2) Force required to pull out R knob	500 ± 200g to pull out to the 1st stage 1,350 ± 450g to pull out to the 2nd stage
	3) Rattling of R knob	No vertical rattling 0.3 mm max. in back-forth and right-left directions in stored position. 1.0 mm max. at tip of the rewinding knob in pulled-out position. Gap between the knob and crank: 0.3 mm max.
		
	4) Spring force of R lever	30 to 40g at raising start of the lever tip
	5) Friction	15 ± 5g on the knob (with no film loaded) 

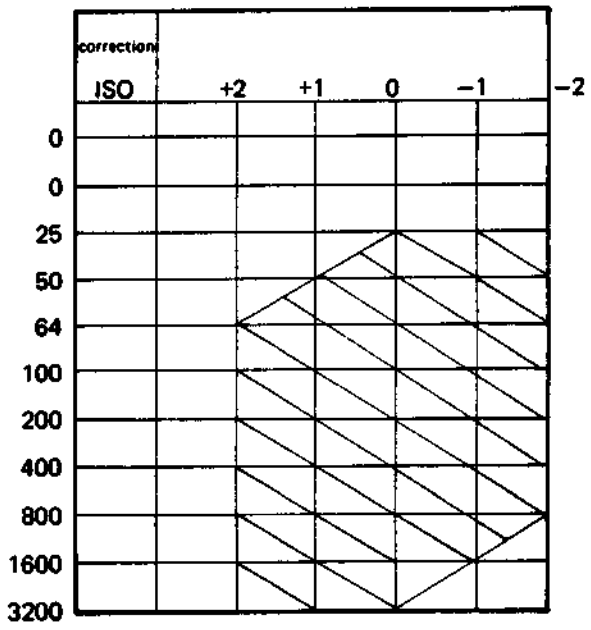
Major check point	Item to be checked	Standard and check procedure
9. Film advance leve·	1) Operation reliability	A single stroke of the film advance lever must cause film feeding to the next frame, and charging of the shutter and mirror without fail.
	2) Smoothness of operation	The film advance lever must operate smoothly with no remarkable seizure, rattling, friction, creak or abnormal noise at the initial stage.
	3) Force required for turning	1.3 kg max. as measured at the lever tip with film loaded. 
	4) Rattling of winding lever	 A – B = 0.25 mm max. Rattling in back-forth or right-left direction: 0.1 mm max. (as measured at center of the shaft)
	5) Force for stand off pull-out	100 ± 50g as measured at lever tip
	6) Angle for stand off pull-out	30 ± 5° 
	7) Film advance angle	130°

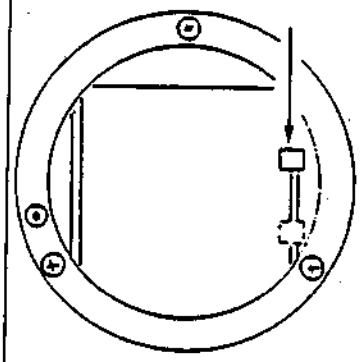
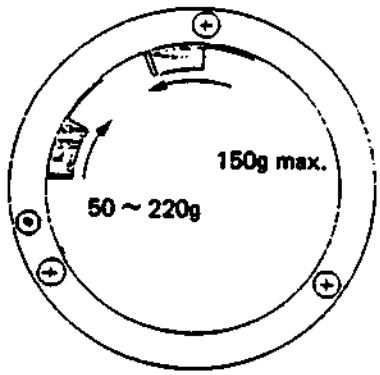
Major check point	Item to checked	Standard and check procedure
10. Release button	1) ON position of indication switch	The indication switch must be turned ON by depressing release button at its first stage. 
	2) Releasing position	The shutter must be released when the button is depressed 0.5 ± 0.2 mm as measured from the top surface of the button seat. 
	3) Depth of release core	The shutter should be released when the releasing core is set within 10 mm as measured from the button top. 
	4) Reset position of switch	The switch must be turned OFF when it is reset to a position 1.3 ± 0.15 mm as measured from the top of the button seat. 
	5) Force required to release shutter	Force to turn ON switch: 50 ± 10g Force to release shutter: 260 ± 60g
	6) Rattling of release button	No vertical rattling Tilting: 0.4 mm max.
11. Film counter	1) Deviation between index and counter	0.4 mm max. (deviation between center of character height and center of the index) 

Major check point	Item to be checked	Standard and check procedure
	2) Indication of "No. 1"	After closing the rear cover, "No. 1" must be indicated by feeding three film frames.
	3) Operation reliability	The film counter must advance 1 step each time a single frame is fed. The film counter must stop when "E" is indicated. The film counter must return to "S" upon opening the rear cover at any film position.
12. Rear cover	1) Closing reliability	The rear cover must not be opened by depressing any part of it. The rear cover must not be opened by weight of the camera when the R knob is raised. The rear cover must be opened when R knob is pulled up further from the 2nd stage.
	2) Rattling and tilting of rear cover	Back-forth rattling: 0.5 mm max. Tilting: 0.5 mm max.
	3) Rattling of hinge	0.15 mm max.
	4) Gap between rear cover and top/bottom cover	0.9 mm max. with no deviation
	5) Force required to close rear cover	3 kg max. (with film loaded)
13. Pressure plate	1) Force of pressure plate	600 ± 100g on sprocket side 250 ± 50g on film cassette side with the rear cover closed
	2) Parallelism of pressure plate	Within 2 mm relative to the rear cover when it is opened. 
	3) Rattling of pressure plate	0.25 mm. in any direction
14. Sprocket	1) Position of tooth	21.0 ± 0.5 mm as measured from the mask to the sprocket tooth  Measure while urging the sprocket toward the mask.

Major check point	Item to be checked	Standard and check procedure
	2) Rattling of sprocket	Vertical: 0.3 mm max. Radial: 0.15 mm max. Rotating direction: 1.8 mm max. (in case of sprocket d. 12 mm) 
15. Spool	1) Rattling of spool 2) Force required to turn spool	Vertical: 1.0 mm max. Radial: 0.25 mm max. 
16. Shutter dial	1) Click force 2) Rattling 3) Indicating deviation Index point B. 1, 2, 4 and 8 15, 30 and 60 125	Force required to disengage click: 1.8 ± 0.3 kg-cm Intermediate section: 500 ± 200 g-cm 0.1 mm max. at position of the index Thrusting or radial rattling: 0.1 mm max. Deviation of 250 should be as specified below:  Should not be out of position. Should be within ±0.3 mm from the center of the figure. Should be within ±0.3 mm from the center of the two digits. Should be within ±0.3 mm from the center of the middle digit.

Major check point	Item to be checked	Standard and check procedure
		Deviation of 500 should be as specified below: 500 within 0.3 mm against the β. β = 0.35 Deviation of 1000 should be as specified below: 1000 within 0.3 mm against the β. β = 0
17. Rewinding button	1) Operation reliability	The sprocket must turn freely without fail by setting the rewind button. Depressed position of rewind button 1.6 ± 0.4 mm Position to actuate clutch (button height) 2.5 ± 0.3 mm
	2) Resetting reliability	Upon film loading or winding by holding the sprocket manually, the rewinding button must be reset during a single stroke of the advance lever.
	3) Force required to depress rewind button	320 ± 50g
18. Mode selector knob	1) Operation reliability	Modes must be selectable without fail. No remarkable deviation between indication and stop position.
	2) Click force	PROGRAM ↔ AUTO 500 ± 50g B. CHECK ↔ MANUAL 500 ± 50g PROGRAM ↔ B. CHECK 500 ± 50g
	3) Reliability of B. C. check operation	B. C. check operation must be indicated by the LED and PCV without fail.
19. ISO dial	1) Reliability of ISO dial operation	"ISO" character must be indicated in the window for confirmation. Periphery of numeric may be in contact with the window. Neighboring numeric may be slightly visible. Radial rattling: 0.2 mm max.

Major check point	Item to be checked	Standard and check procedures
	2) Force required to raise ISO dial	250 ± 100 g·cm
20. "±" exposure compensation dial	1) Correcting reliability	Deviation of the index: Within ±0.2 mm Center of the horizontal line must not deviate from the index on the top cover at ±0. Indication in the viewfinder: "+–" mark blinks
	2) Click force	600 ± 200 g·cm
	3) Correctable range	 Oblique lines indicate correctable ranges.
21. Self-timer lever	1) Operation reliability of self-timer	Upon releasing the shutter, the self-timer must start operating with intermittent sound and blinking LED indications without fail. The shutter must be released in a preset time 12 ± 3 sec. The self-timer lever must be returned automatically by next film advance. The shutter will fire by returning the self-timer lever to its original position while it is running.
	2) Force required to turn	500 ± 100 g max. (as measured at the lever tip)
	3) Flickering interval	LED frequency 2 Hz PCV frequency 2 Hz, sounding tone at 2 kHz (for 12 sec)

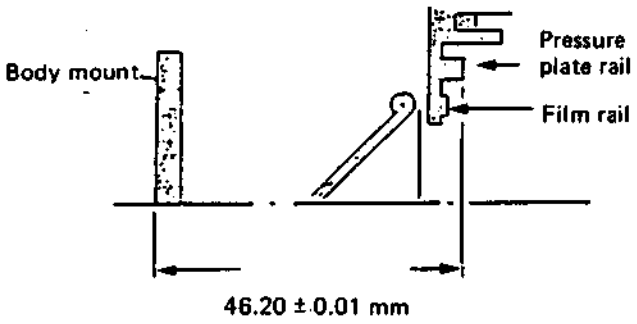
Major check point	Item to be checked	Standard and check procedure
22. Stop down lever	1) Force required to turn lever 2) Return force	 115 ± 20g (Stop down completon position: 4.3 mm above the optical path) At least 50g (in intermediate course) At least 150g (at start of return)
23. Diaphragm interlock ring	1) Force required to turn ring	 150g max. 50 ~ 220g
24. Quick return mirror	1) Smoothness of motion 2) Shutter release position	The mirror must move without pause or abnormal noise. The 1st curtain must be released when the mirror tip rises at least 8 mm above the film center.
25. B mount	1) Torque required to mount and dismount standard lens 2) Locking reliability	4 ~ 7 kg·cm The B mount must be locked at its stop position without fail. Deviation of index due to rotational rattling: Within 0.2 mm
26. Combination with T-series flash (program mode)	1) Operation reliability	• Exposure in the program mode must be possible by setting the mode selector lever at PROGRAM on the camera. • The flash must be controlled in the program mode by TTL direct light measurement with the diaphragm ring of the lens set at the minimum aperture position. • The flash must fire at a bar indication lower than 1/60.

Major check point	Item to be checked	Standard and check procedure
		• Indication must return to PROGRAM by turning OFF the flash.
	2) Exposure compansation	• Exposure must be compensated correctly within a range of ±0.3 EV taking ±0 as standard by using the compensation dial.
	3) Indication reliability	• " ⚡ " mark LED must be lit by charging the flash. • " ⚡ " mark LED must flicker when light intensity is at suitable level. • " ⚡ " mark LED must be extinguished when light intensity is too low.
28. Combination with T-series flash (auto mode)	1) Operation reliability	• The flash must be controlled by TTL direct light measurement when the mode selector lever is set at AUTO. • The flash must fire at a bar indication lower than 1/60. • Indication must return to AUTO by turning OFF the flash.
	2) Exposure compensation	• Exposure must be compensated correctly within a range of ±0.3EV taking ±0 as standard by manipulating the exposure compensation dial.
	3) Indication reliability	• " ⚡ " mark LED must be lit by charging the flash. • " ⚡ " mark LED must flicker when light intensity is at suitable level. • " ⚡ " mark LED must be extinguished when light intensity is too low.
29. Combination with T-series flash (manual mode)	1) Operation reliability	The flash must fire at all the shutter speeds with the mode selector lever set at MANUAL. (Synchronization at speeds 1/60 sec. or slower)
	2) Exposure compensation	The bar tip must shift upon manipulating the exposure compensation dial.

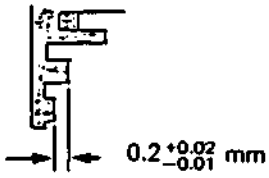
Major check point	Item to be checked	Standard and check procedure
	3) Indication reliability	" ⚡ " mark LED must light upon completing charging of the flash. " ⚡ " mark LED must be extinguished after two sec from flash firing.
30. Motor drive	1) Operation reliability	Film must be wound without fail when the motor drive and winder are set in position.
	2) Sequence photo-graphing speed	3.5 frames/sec at 1/1000 sec with motor drive. 2.2 frames/sec at 1/1000 sec with windew (at 20° C, with new battery)
	3) Force required to operate release plate	180 ± 20g
	4) Full stroke	At least 2.5 mm
	5) Release position	2 ± 0.4 mm
	6) Contact	Insulation position form bottom plate: 0 ± 0.05 Contact position from bottom plate: 0.1 ± 0.2
	7) Continuity and insulation resistance	0.2Ω max. in continuous condition Insulation resistance: At least 50 MΩ at 20V (between contact and body)

II. PERFORMANCE

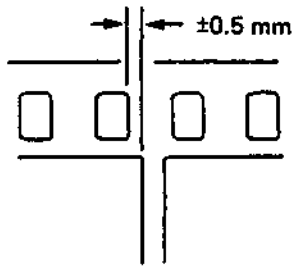
1. **Flange-focal distance and optical path length**
   Optical path length of viewfinder:
   46.05 ± 0.02 mm (using focussing screen)
   (Variation of viewfinder focal length caused by film advance or positional difference 0.02 mm max.)
   Flange-focal length (the pressure plate rail):
   46.20 ± 0.01 mm
   Flange back distance: 46.00 ± 0.02 mm



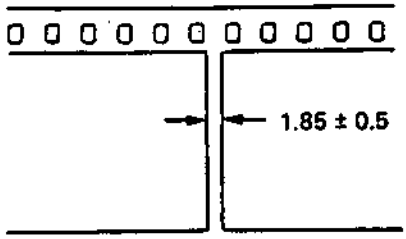
2. **Tunnel space**
   $0.2^{+0.02}_{-0.01}$ mm



3. **Position of perforations**
   The perforations must not be located within a range of ± 0.5 mm of the center line between succeeding film frames.



4. **Space between image planes**
   1.85 ± 0.5 mm in normal film advance condition
   At least 0.6 mm in abnormal film advance condition



5. **Vertical deviation of actual image plane**
   The picture area must not overlap with the perforations.

6. **Manual shutter speeds**

Speed	Central value	Standard for adjustment	Standard for inspection
1/1000	0.98	0.80 ~ 1.20	0 ± 0.6 EV (0.65 ~ 1.48)
1/500	1.95	1.60 ~ 2.40	0 ± 0.4 EV (1.48 ~ 2.58)
1/250	3.91	3.40 ~ 4.49	0 ± 0.4 EV (2.96 ~ 5.15)
1/125	7.82	6.80 ~ 8.97	0 ± 0.4 EV (5.92 ~ 10.3)
1/60	15.6	12.8 ~ 19.2	0 ± 0.4 EV (11.8 ~ 20.6)
1/30	31.3	27.2 ~ 35.9	0 ± 0.4 EV (23.7 ~ 41.2)
1/15	62.5	54.4 ~ 71.8	0 ± 0.4 EV (47.4 ~ 82.5)
1/8	125	109 ~ 144	0 ± 0.4 EV (94.7 ~ 165)
1/4	250	218 ~ 287	0 ± 0.4 EV (189 ~ 330)
1/2	500	435 ~ 874	0 ± 0.4 EV (379 ~ 660)
1/1	1000	900 ~ 1100	0 ± 0.4 EV (758 ~ 1320)

Curtain speed:
$\bar{X}$ = 10.5 ± 0.1ms at 1/1000 (at 20°C)
(Variation during 25 shutter releasing operations, except the first)
Difference between the 1st and 2nd curtain speeds: $\bar{X}$ 0.10 ms max.
(Variation during 25 shutter release operations, except the first)

Stability of curtain speed:

All measured values of 25 successive exposure times except the first should be within the standard range specified above.

Exposure variation:

0 ± 0.35 EV at shutter speed of 1/1000 (for B channel)

0 ± 0.3 EV at shutter speed of 1/500 or lower (for B channel)

Difference between neighboring shutter speeds:

1 ± 0.3 EV at shutter speeds of 1/1 to 1/1000

(Average value of 5 exposure times as compared with neighboring average value.)

7. Aperture-preferred automatic exposure (AUTO mode)

A. Automatic exposure accuracy

ISO (ASA) 100, F5.6, K = 1. 3

BV	Central value	Standard for adjustment	Standard for inspection
15	0	0 ± 0.6 EV	0 ± 0.75 EV
11	0	0 ± 0.3 EV	0 ± 0.4 EV
8	0	0 ± 0.3 EV	0 ± 0.4 EV
4	0	0 ± 0.3 EV	0 ± 0.6 EV

*Maximum exposure time: 2 ± 0.5 sec

B. ISO switching accuracy

ISO 100, ± 0 correction

BV	ISO at measuring position	Standard for adjustment	Standard for inspection
8	25	± 0.35 EV	−0.3 ± 0.5 EV
8	400	± 0.35 EV	0 ± 0.5 EV
8	1600	± 1.0 EV	$+0.25^{+0.75}_{-0.50}$ EV
8	3200	+0.4 ~ +1.65	$+0.5^{+1.2}_{-0.50}$ EV

NOTE: Step between neighboring ISO levels
ISO 25 ~ 800 at least 0.6 EV per EV
ISO 800 ~ 3200 at least 0.5 EV per EV

C. ± compensation accuracy

Standard conditions: BV12
ISO100

Compensation value	Standard for adjustment	Standard for inspection
−2 EV	±0.3 EV	±0.3 EV
−1 EV	±0.3 EV	±0.3 EV
±0 EV	±0 EV	±0 EV
+1 EV	±0.3 EV	±0.3 EV
+2 EV	±0.3 EV	±0.3 EV

NOTE: Exposure compensation step must be at least 0.7 EV per EV.

8. Programmed automatic exposure (PROGRAM mode)

A. Automatic exposure accuracy

Conditions: ISO100, K = 1. 3,
MS5018 standard lens

BV	EE accuracy	Aperture control accuracy	F. No.	S. S.
15	0 ± 0.5 EV	0 ± 1.2 EV	8	1/500
12	0 ± 0.4 EV	0 ± 1.0 EV	4.5	1/125 ~ 1/250
8	0 ± 0.4 EV	0^{+0}_{-1} EV	Open	1/60

NOTE: EE should be adjusted in the aperture-preferred mode. The diaphragm must be kept open at shutter speeds of 1/60 and slower.

*Maximum exposure time: 2 ± 0.5 sec

B. ISO switching accuracy

Standard conditions: ±0 correction
ISO100

BV	ISO at measuring position	Standard for adjustment	Standard for inspection
12	25	±0.6 EV	−0.3 ± 0.5 EV
8	400	± 0.4 EV	0 ± 0.5 EV
8	3200	± 0.9 EV	$+0.5^{+1.2}_{-0.5}$ EV

NOTE: Step between neighboring ISO levels
ISO 25 ~ 800 at least 0.6 EV per EV
ISO 800 ~ 3200 at least 0.5 EV per EV

C. ± compensation accuracy

Standard conditions: F5.6, BV12, ISO100

Compensation value	Standard for adjustment	Standard for inspection
–2 EV	±0.3 EV	±0.3 EV
–1 EV	±0.3 EV	±0.3 EV
±0 EV	±0 EV	±0 EV
+1 EV	±0.3 EV	±0.3 EV
+2 EV	±0.3 EV	±0.3 EV

NOTE: Compensation step must be at least 0.7 EV per EV.

9. Flash program

BV8 → Between open diaphragm and F5.6

BV4 → Between open diaphragm and F5.6 (must be on the open diaphragm side from BV8)

10. Exposure indication

A. Indicating accuracy (AUTO mode)

Standard conditions: ISO (ASA) 125, MS5018 standard lens

BV	F. No.	Indication	Standard
16	5.6	1/1000 blinks	± 1.0 EV max.
14	5.6	1/500	± 1.0 EV max.
12	8	1/60	± 1.0 EV max.
12	4	1/250	± 1.0 EV max.
8	5.6	1/8	± 1.0 EV max.
4	5.6	1 sec	1sec

B. ISO switching accuracy

Standard conditions: BV12, MS5108 standard lens

ISO	F. No.	Indication	Standard
400	8	1/250	± 1.0 EV max.

C. Indication accuracy (MANUAL mode)

Standard conditions: ISO (ASA) 100, MS5108 standard lens

BV	F. No.	Indication	Standard
14	8	1/250	± 1.0 EV max.
12	8	1/60	± 1.0 EV max.
8	4	1/15	± 1.0 EV max.

D. ± compensation accuracy

Standard conditions: F5.6, BV8, ISO (ASA) 100 ± 0 EV (1/8), MS5018 standard lens

Correction value	Indication	Standard
–2 EV	1/30	±0.4 EV
–1 EV	1/15	±0.3 EV
±0 EV	1/8	±0 EV
+1 EV	1/4	±0.3 EV
+2 EV	1/2	±0.4 EV

At least 2/3 EV per EV.

11. DX accuracy

A. DX EE accuracy

BV	Standard for adjustment	Standard for inspection
15	±0.65EV	±0.65EV
12	±0.35EV	±0.35EV
8	±0.35EV	±0.35EV
4	±0.35EV	±0.35EV

*Error between DX ISO AUTO SET and ISO manual set must be within 0.5 EV

B. ISO switching accuracy

ISO	Standard for adjustment	Standard for inspection
25	±0.35EV	±0.35EV
400	±0.35EV	±0.35EV
1600	±0.10EV	±0.10EV
3200	+0.4 ~ 1.65EV	+0.4 ~ 1.65EV

12. ESP compensation accuracy

A. ESP-EE accuracy (The out-put voltage difference between BBV and ABO)

The voltage difference between ESP switch ON and OFF must be within 1mV in the testing mode at BV13.

Measure voltage across Vref and BV3.

B. ESP-BV accuracy

Display: ON, ESP-SW: ON

Measure voltage across camera body and CPU IC pin 43.

100mV max. at BV7 (ESP LED extinguished)

1V min. at BV9 (ESP LED appeared).

13. **Time lag**
    0.1 to 0.8 ms after full opening of the 1st curtain.

14. **Contact efficiency**
    At least $\overline{X}$40% at intervals of 1 ms at a shutter speed of 1/60 sec.

15. **Insulation resistance**
    At least 30 MΩ at 500V

16. **Indications by B. check LED and PCV**
    Judging voltage: 2.60V $^{+0}_{-0}{}^{\cdot 05}$ V
    Warning voltage: Lock voltage +0.1 ± 0.05V.

17. **Release lock voltage**
    2.6 $^{+0}_{-0}{}^{\cdot 05}$V

18. **Unlocking**
    2.95V or more

19. **Current consumption**

10 ± 10μA	for LED indication OFF in the viewfinder
3mA	for LED indication in the viewfinder
7-10mA	for self-timer
7-10mA	for battery check
7-10mA	during shutter operation

C

DISASSEMBLING PROCEDURES

C. DISASSEMBLING PROCEDURES

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(Detachment of Front Plate Ass'y)

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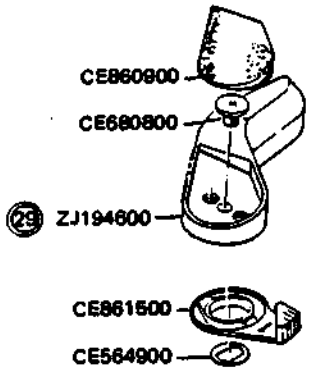
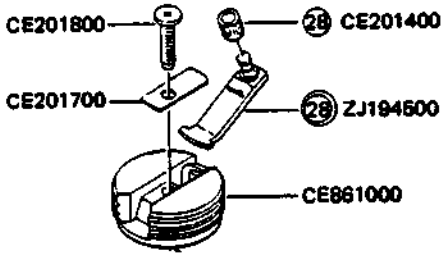
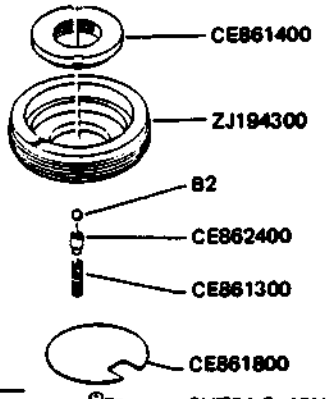
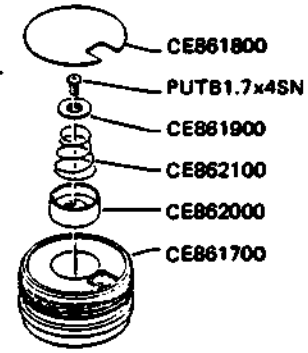
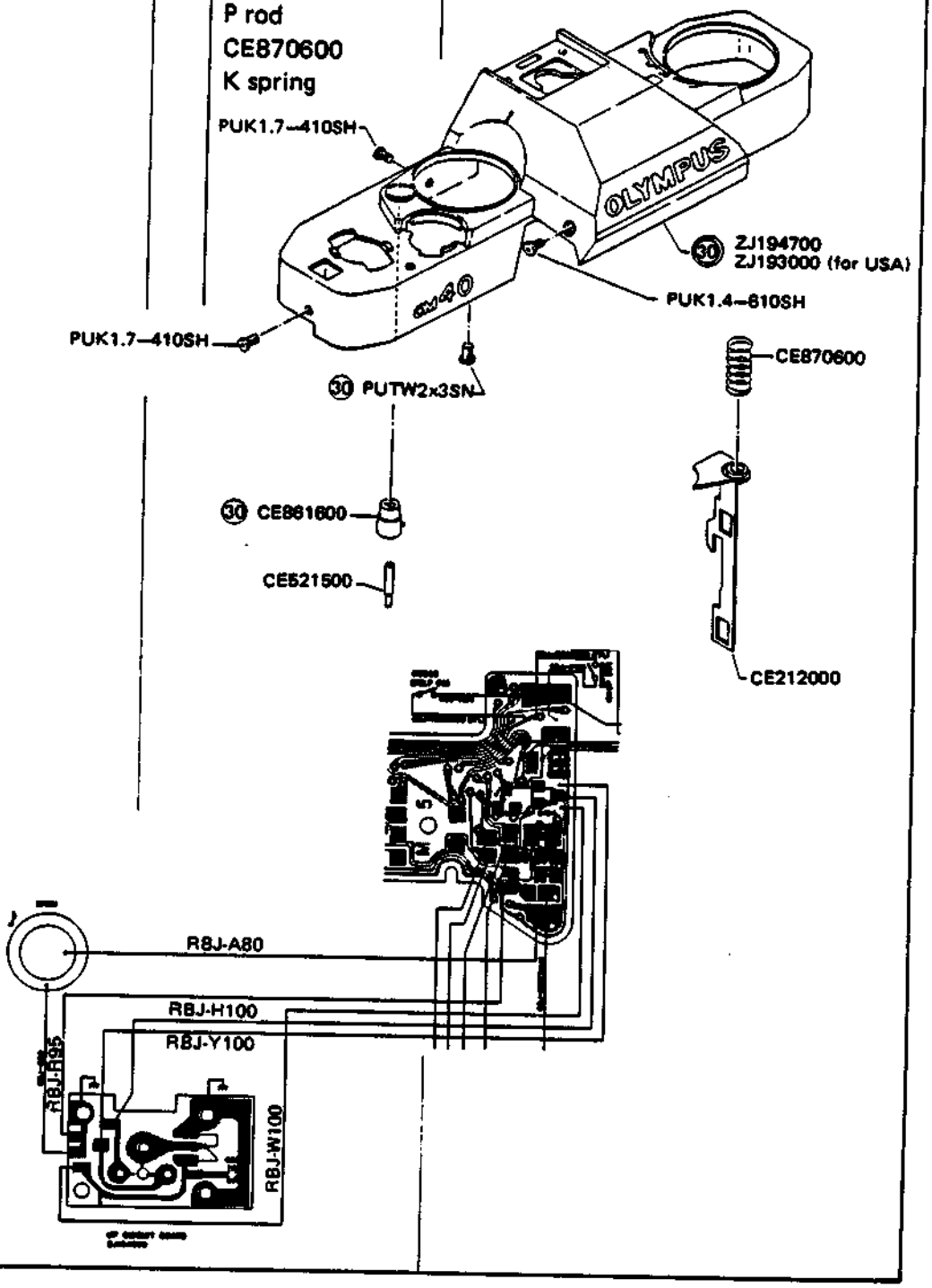
VIII. DISASSEMBLY OF FILM WIND UNIT C-13

C. DISASSEMBLING PROCEDURES

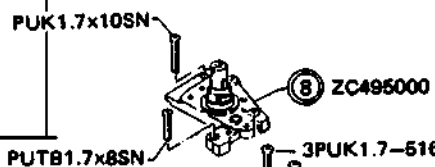
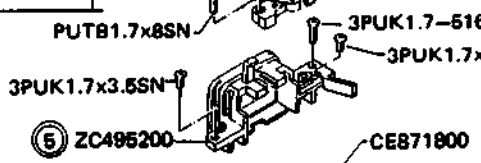
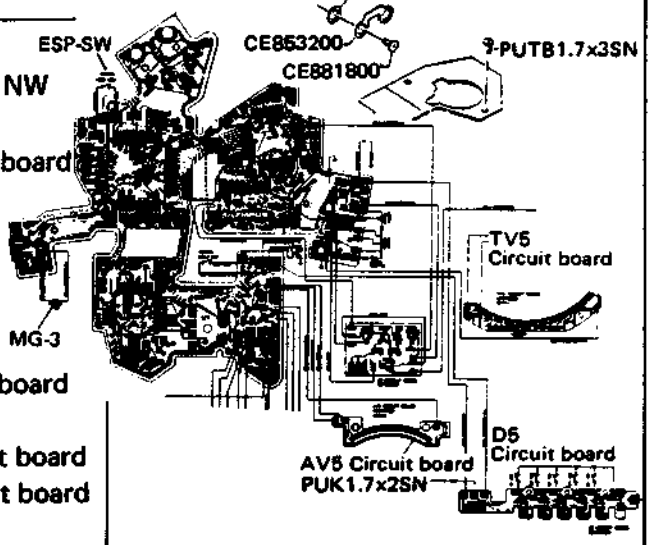
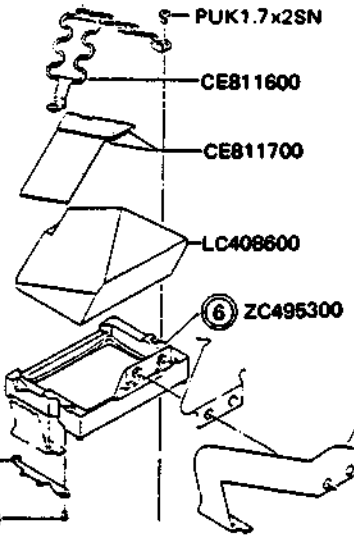
I. REMOVAL OF TOP COVER ASS'Y

Main part	Part to be removed	Q'ty	Removable part	Remarks
1. Film advance lever * Bonded with paste and should be removed forcibly upward.	CE860900 L cover	1	ZJ194600 W lever CE564900 Washer CE861500 Self lever	
	CE860800 L screw	1		
2. R knob	CE201800 R screw	1	CE861000 R knob ZJ194500 R lever CE201700 R lever spring	
3. Mode selector knob	CE861400 R nut	1	ZJ194300 M selector knob CE862400 H shaft CE861300 R spring B2	
4. ISO knob	CE861800 DX plate PUTB1.7x4SN	1	CE861900 A stopper CE862100 A spring CE862000 A washer CE861700 ISO knob	

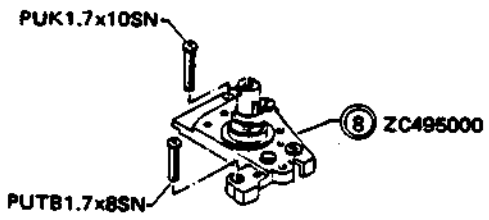
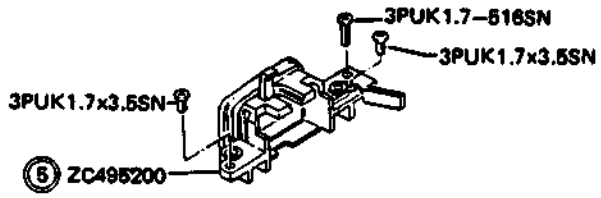
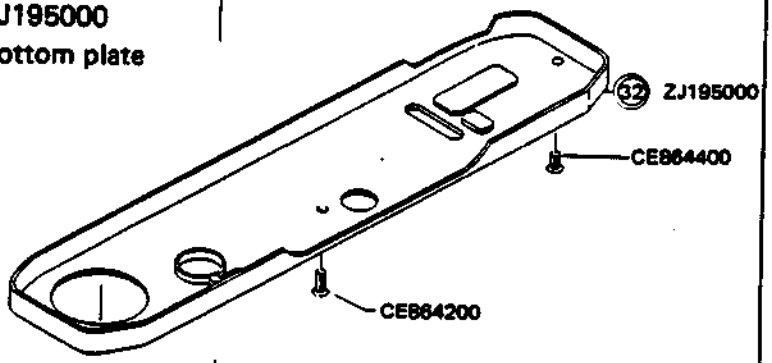
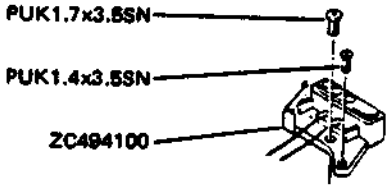
Main part	Part to be removed	Q'ty	Removable part	Remarks
5. Top cover ass'y	PUK1.4–610SH	2	ZJ194700	
	PUK1.7–410SH	4	Top cover	
	RBJ-A80	1	CE861600	
	RBJ-Y100	1	R button	
	RBJ-H100	1		
	RBJ-W100	1		
	RBJ-R95		CE521500	
			P rod	
			CE870600	
			K spring	



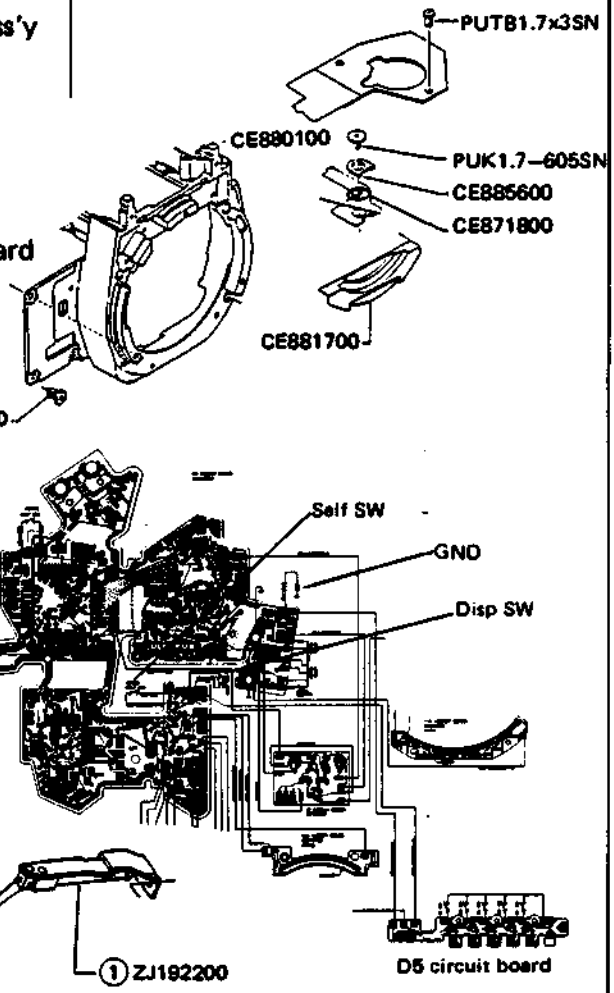
II. REMOVAL OF L5 CIRCUIT BOARD

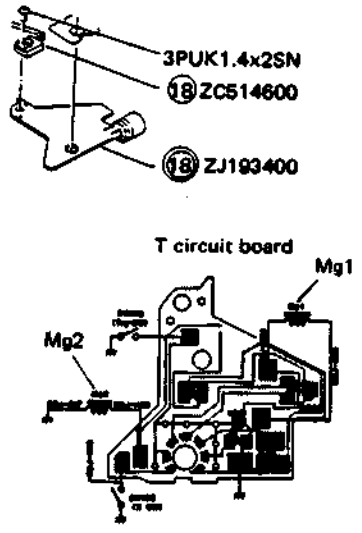
Main part	Part to be removed	Q'ty	Removable part	Remarks
1. ISO base	PUK1.7x10SN PUTB1.7x8SN	1 1	ZC495000 ISO base	
2. E.P. frame	PUK1.7–516SN 3PUK1.7x3.5SN	1 2	ZC495200 E.P. frame	
3. M5 circuit board	CE881800 Connector screw PUTB1.7x3SN RBJ-M35 RBJ-M70 RBJ-A45 RBJ-R50 RBJ-D95 RBJ-C92 RBJ-Y76 RBJ-A132 RBJ-R90	2 2	CE853200 Connector NW ZC495700 M5 circuit board ESP-SW MG-3 D5 circuit board TV5 circuit board AV5 circuit board	
4. Penta-prism	PUK1.7x2SN	2	CE811600 P holder CE811700 P cover LC408600 P prism ZC495300 P frame	
5. L5 circuit board	CE865400 C screw	1	CE865300 C holder ZJ192800 L5 circuit board	

III. REMOVAL OF T-CIRCUIT BOARD (DETACHMENT OF FRONT PLATE ASS'Y)

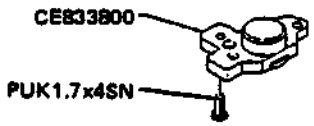
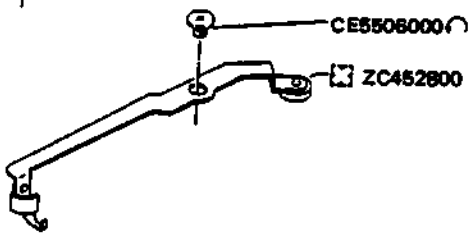
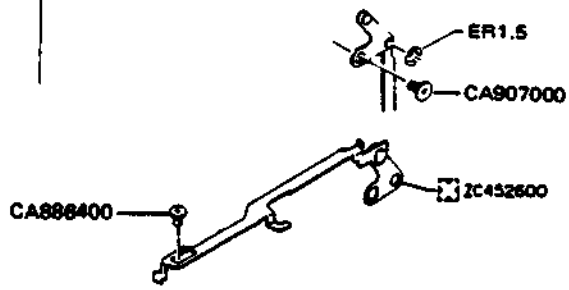
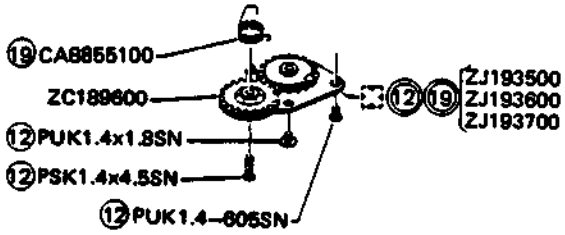
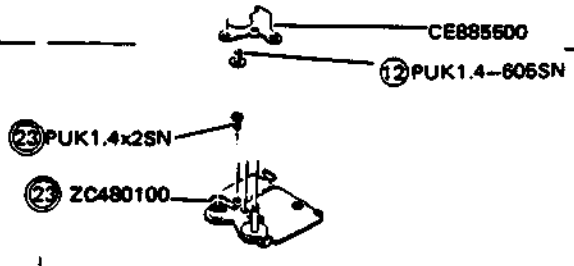
Main part	Part to be removed	Q'ty	Removable part	Remarks
1. ISO base	PUK1.7x10SN PUTB1.7x8SN	1 1	ZC495000 ISO base	
2. E.P frame	PUK1.7–516SN PUK1.7x3.5SN	1 2	ZC495200 E.P frame	
3. Bottom plate	CE864400 B screw 4 CE864200 B screw 3	2 1	ZJ195000 Bottom plate	
4. M.D. switch	PUK1.7x3.5SN PUK1.4x3.5SN	1 1	ZC494100 M.D. switch	

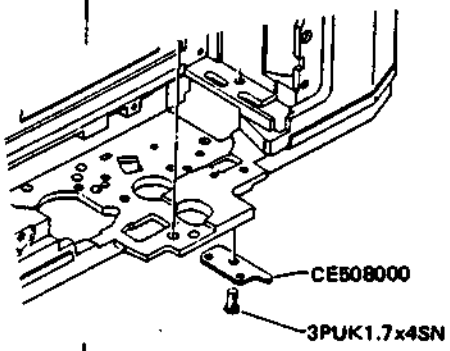
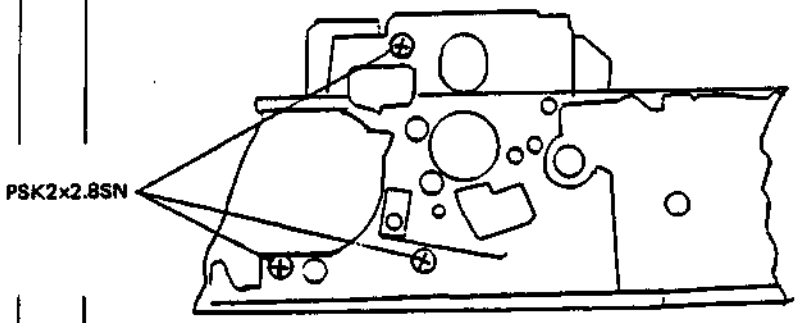
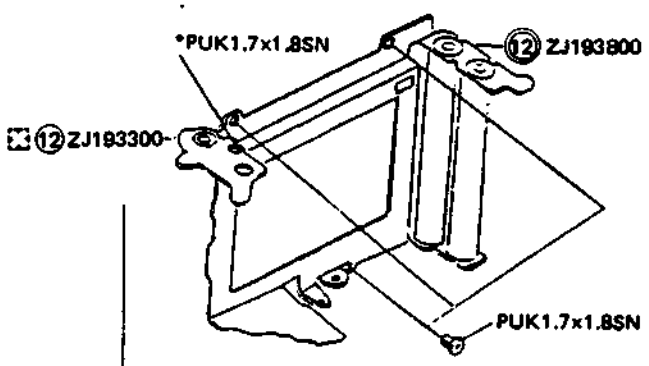
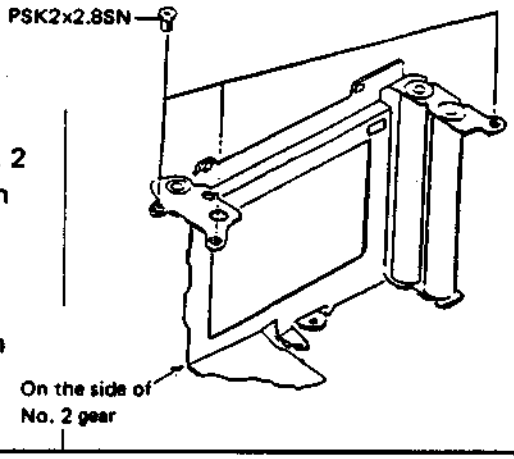
Main part	Part to be removed	Q'ty	Removable part	Remarks
5. Front plate ass'y	PUTB1.7x3SN	2	CA880100	
	CA915500	5	Front plate ass'y	
	F screw		CE885600	
	CE881700	1	T washer	
	B cover		CE871800	
	PUK1.7–605SN	1	Silicon NW	
	RBJ-D95 RBJ-C92 RBJ-Y76		D5 circuit board	
	RBJ-P60	2	DSP-SW	
	RBJ-H86	2	SELFSW	
	RBJ-B110		GND CA915500	
	RBJ-M90 RBJ-A90		M contact 1 M contact 2	
2. T circuit board	3PUK1.4x2SN	1	ZJ193400 T circuit board MG1	
	RBJ-R35 RBJ-G35 RBJ-B17 RBJ-H35		MG2	



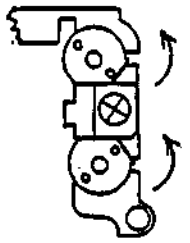
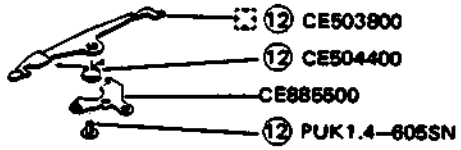
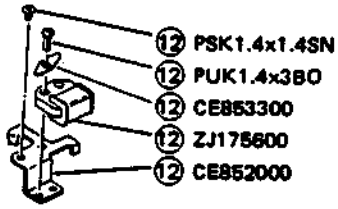
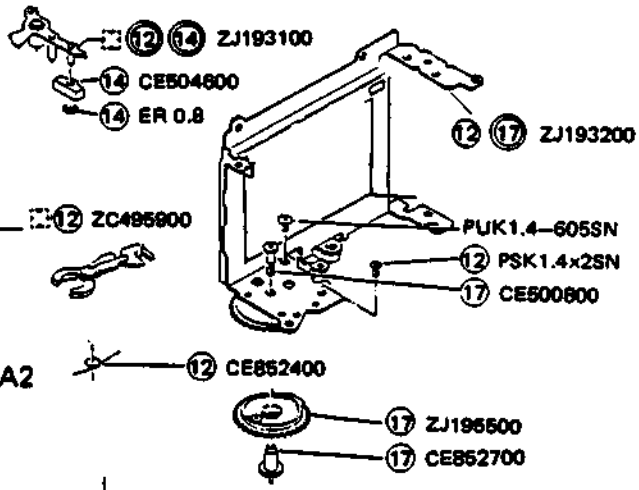


IV. DISASSEMBLY OF SHUTTER UNIT

Main part	Part to be removed	Q'ty	Removable part	Remarks
1. T mount plate	PUK1.7x4SN	2	CE833800 T mount plate	
2. KM lever	CE550600 M lever shaft 2	1	ZC452800 KM lever	The M lever shaft 2 is left-handed screw. 
3. KL plate	CA886400 KL shaft CA907000 C screw ER 1.5 E washer	1 1 1	ZC452600 KL plate	
4. 4 base plate	PUK1.4–605SN PUK1.4x1.8SN PSK1.4x4.5SN	1 1 1	ZJ193500 4 base plate CA885100 3rd gear spring	
5. S lever	CA884600 S shaft	1	CA993900 S lever	
6. SL plate 3	PUK1.4–605SN PUK1.4x2SN	1 1	ZC480100 SL plate 3 CE885500 G plate	

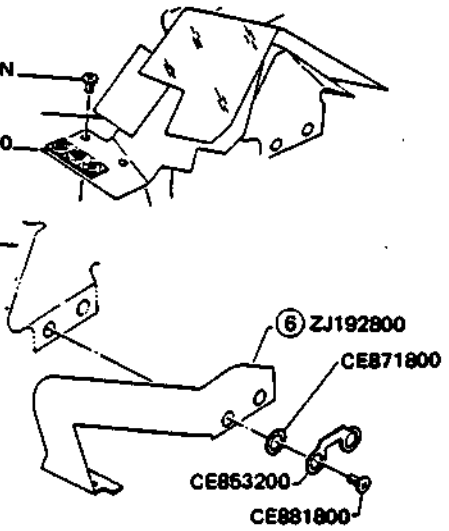
Main part	Part to be removed	Q'ty	Removable part	Remarks
7. C plate	3PUK1.7x4SN	1	CE508000 C plate	
8-1. Shutter unit (lower part)	PSK2x2.8SN	3		
8-2. Shutter unit (mask part) *Fix the ZJ193300 (U. Guide) to ZJ193800 (SC Frame) tentatively by turning the screw PUK1.7x1.8SN to prevent separation.	PUK1.7x1.8SN	3		
8-3. Shutter unit (upper part) *While pushing up the shutter unit on the side of No. 2 gear ZJ183800, remove the lower part of the curtain cylinder from the shutter curtain frame and then separate the shutter curtain unit by raising it to the top of the shutter curtain frame while moving leftward, rightward, back and forth. (Do not deform the SL Lever. Further pull up M lever CE503800 while removing it from the curtain frame.)	PSK2x2.8SN	3	ZJ193800 SC frame 4	

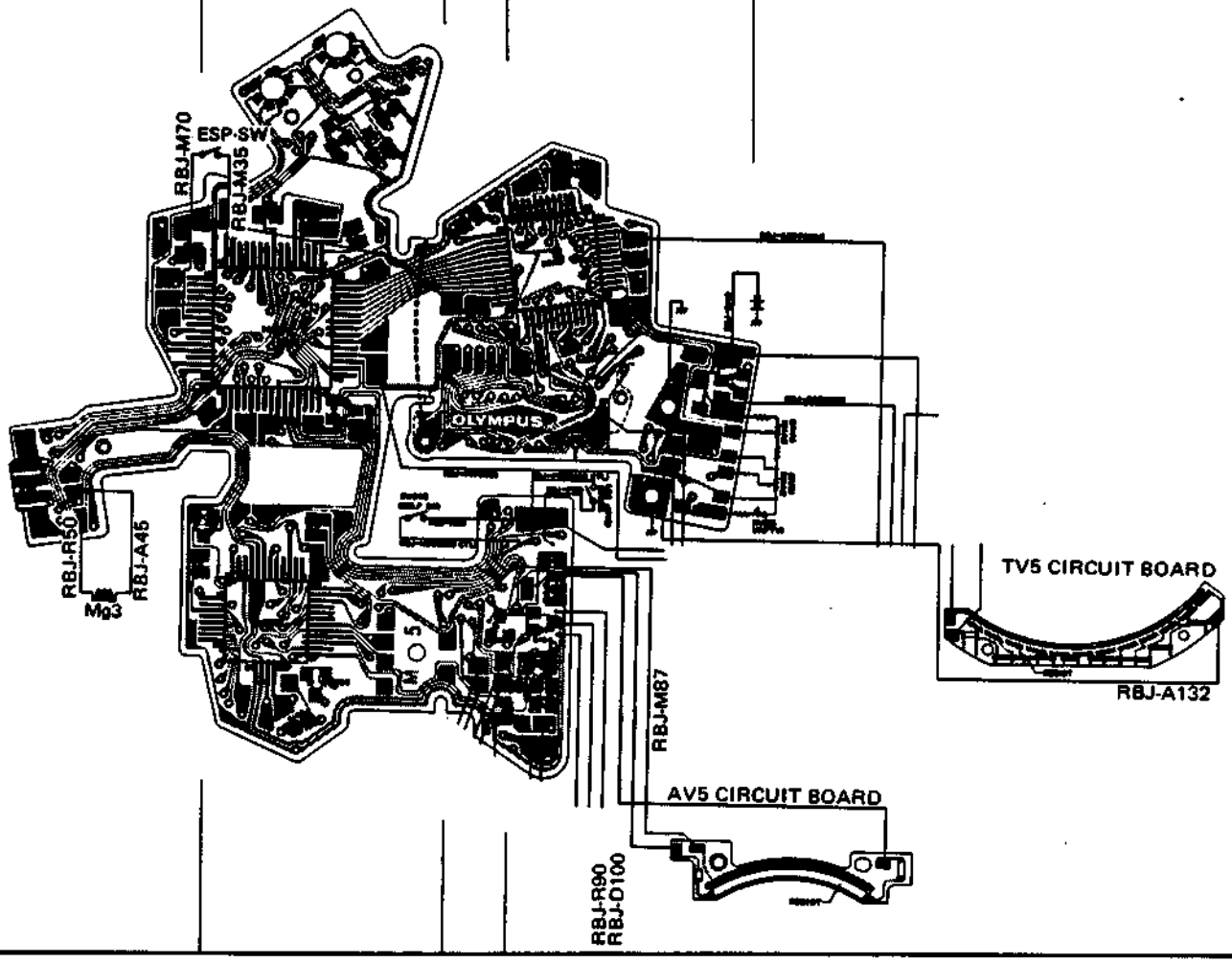
V. DISASSEMBLY OF SHUTTER MECHANISM

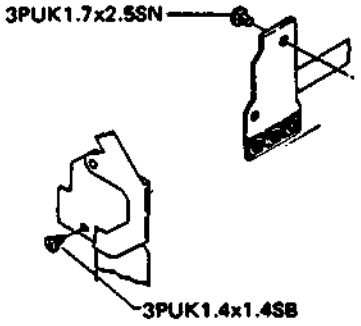
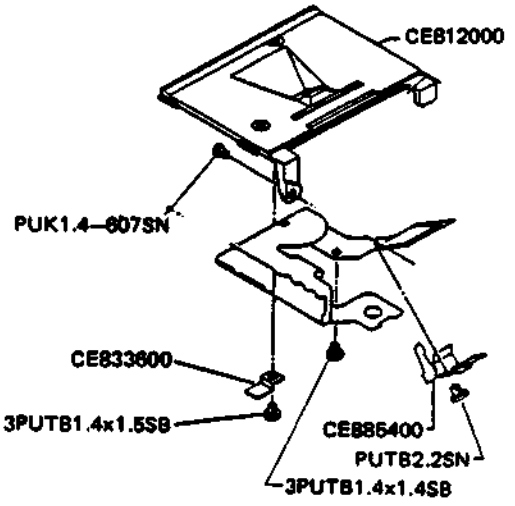
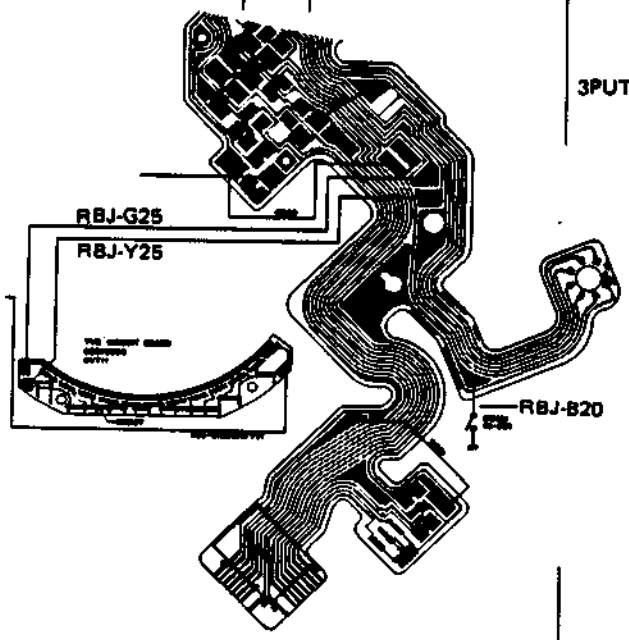
Main part	Part to be removed	Q'ty	Removable part	Remarks
1. Set the shutter curtain torque at 0. The 1st shutter curtain rotates the 1st shaft about 5.5 turns counterclockwise, whereas the 2nd shutter curtain rotates the 2nd shaft about 4 turns counterclockwise.				
2. M lever 2	PUK1.4–605SN	1	CE503800 M lever 2 CE504400 M lever spring	
3. MG plate (MG2)	PUK1.4x1.4SN	2	CE852000 MGB plate ZJ175600 MG plate	
4. S frame 2	PUK1.4–605SN PUK1.4x2SN	1 1	ZJ193200 S frame 2 ZJ193100 R claw ZC495900 B brake CE852400 B spring	
5. Gear AM	CE500800 Gear screw		ZJ195500 Gear AM CE852700 Gear shaft A2	

VI. REMOVAL OF M5 CIRCUIT BOARD

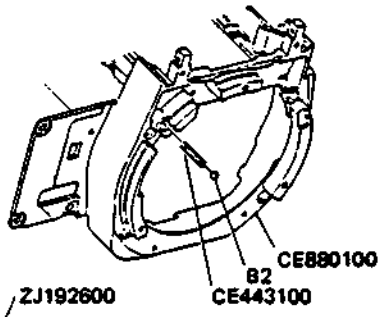
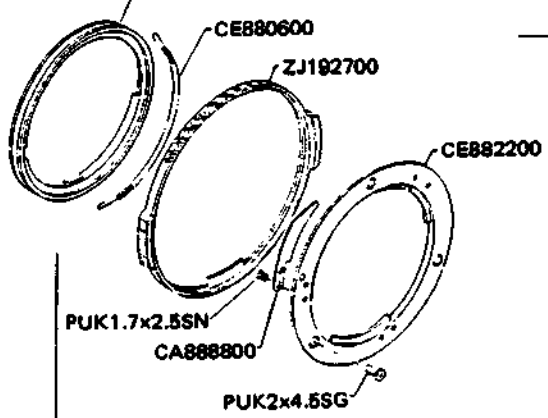
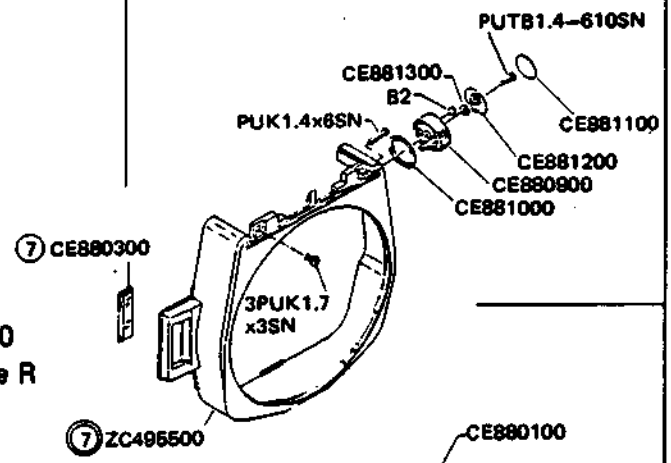
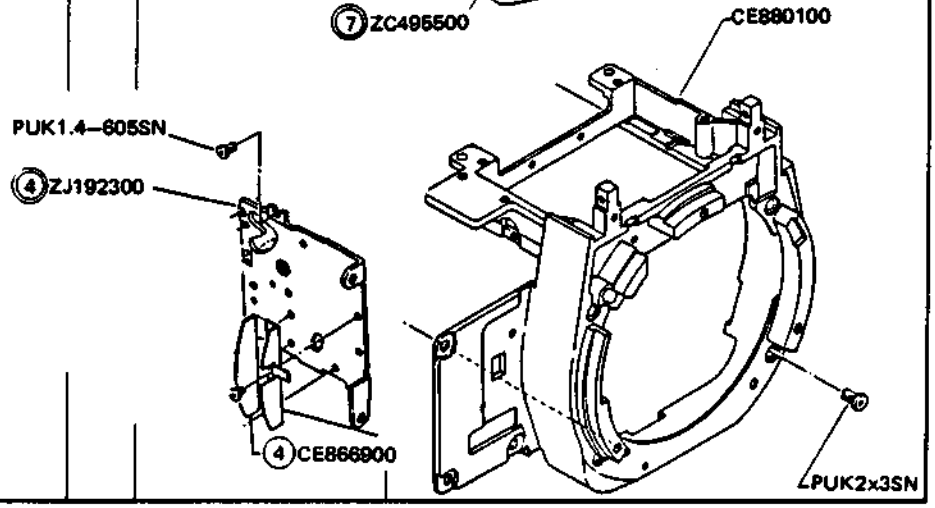
Main part	Part to be removed	Q'ty	Removable part	Remarks
1. Penta prism unit				
M5 circuit board	3PUK1.7x2SN	2	ZC495700	
	CE881800	2	M5 circuit board	
	C screw		CE853200	
			Connector NW	
			CE871800	
			Silicon NW	
Upper left side	RBJ-A45		MG-3	
	RBJ-R50			
	RBJ-M35		ESPSW	
	RBJ-M70			
	RBJ-A132		TV5 circuit board	
	RBJ-R90		AV5 circuit board	
Upper right side	RBJ-D100		AV5 circuit board	
	RBJ-M87			

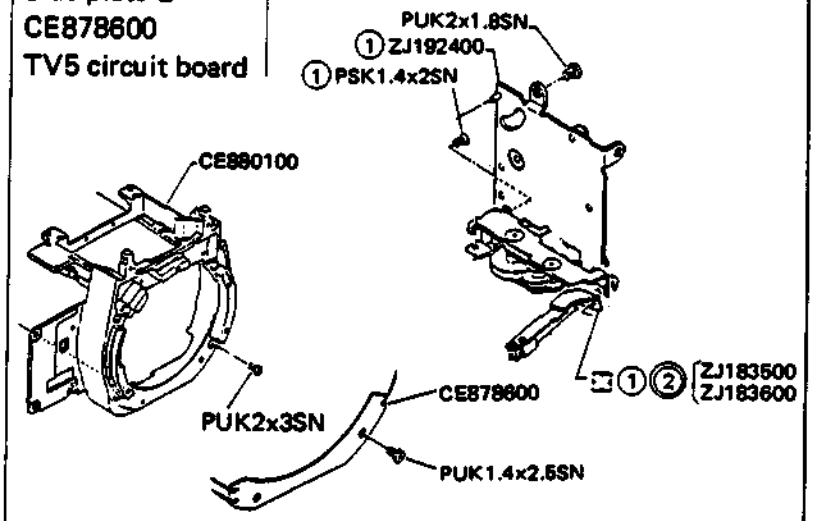
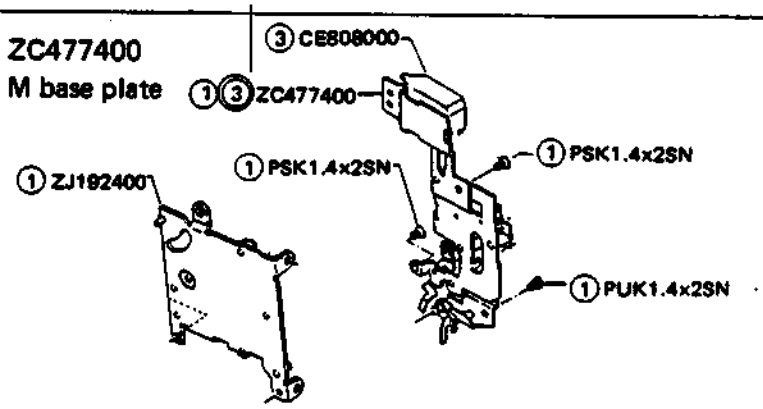
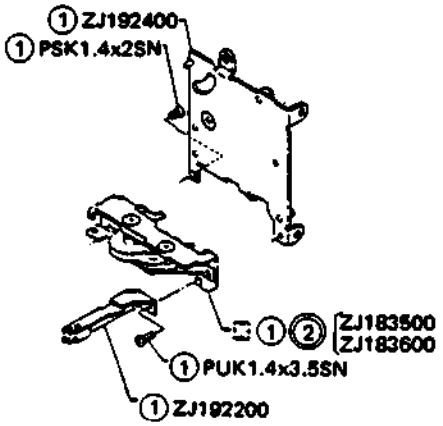




Main part	Part to be removed	Q'ty	Removable part	Remarks
2. Side unit				
M5 circuit board	3PUK1.7x2.5SN 3PUK1.4x1.4SB	2 2	ZC495700 M5 circuit board	
3. L covering plate unit				
M5 circuit board	RBJ-G25 — TV5 circuit RBJ-Y25 — circuit RBJ-B20 M-SW PUK1.4–607SN		ZC495700 M5 circuit board CE812000 L covering plate CE833600 FPC holder CE885400 L holder	 

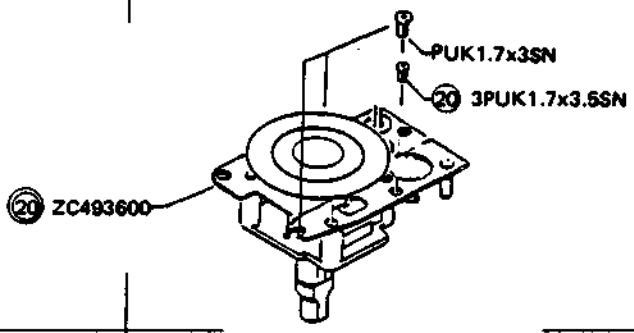
VII. DETACHMENT OF SIDE PLATE L AND R

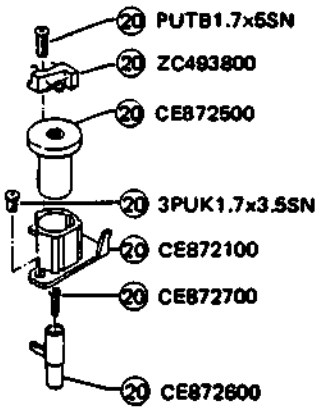
Main part	Part to be removed	Q'ty	Removable part	Remarks
1. B mount	PUK2x4.5SG	3	CE882200 B mount ZJ192700 Shutter dial CE443100 SD spring B2	
2. Front cover	3PUK1.7x3SN CE881100 ESP seal PUTB1.4–610SN PUK1.4x6SN	2	ZC495500 Front cover CE881200 ESP click CE881300 ESP collar CE880900 ESP knob CE881000 ESP ring B2	 
3. Side plate R	PUK2x3SN PUK1.4–605SN	2 1	ZJ192300 Side plate R	

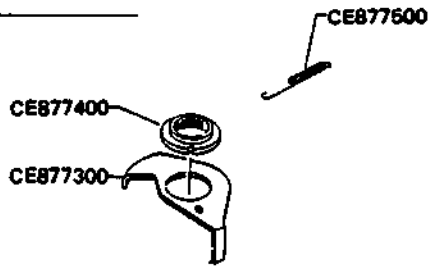
Main part	Part to be removed	Q'ty	Removable part	Remarks
4. Side plate L	PUK2x3SN PUK2x1.8SN PUK1.4x2.5SN	2 1 2	ZJ192400 Side plate L CE878600 TV5 circuit board	
5. M base plate	PUK1.4x2SN PSK1.4x2SN	1 2	ZC477400 M base plate	
6. Releasing unit 2	PSK1.4x2SN PUK1.4x3.5SN	1 1	ZJ183500 Releasing unit 2 ZJ192200 Motor switch	

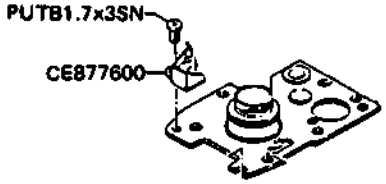
VIII. DISASSEMBLY OF FILM WIND UNIT

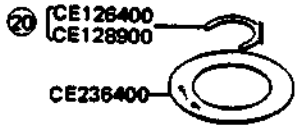
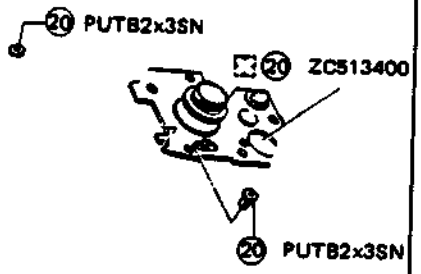
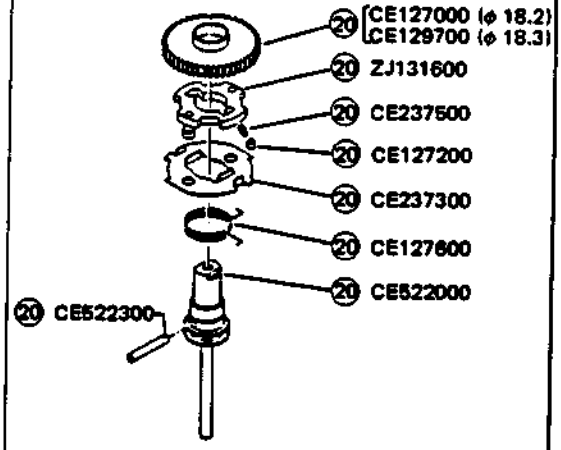
Main part	Part to be removed	Q'ty	Removable part	Remarks
1. Wind unit	PUK1.7x3SN 3PUK1.7x3.5SN	2 1	ZC493600 Wind unit	Whole unit can be removed from the camera body.
2. D frame	PUTB1.7x5SN 3PUTB1.7x3.5SN	1 1	CE872100 D frame CE872500 Release button CE872600 D connector CE872700 D screw ZC493800 D contact CE877500 Self spring	
3. Self lever	CE877400 Self holder		CE877300 Self lever	
4. Self click	PUTB1.7x3SN		CE877600 Self click	









Main part	Part to be removed	Q'ty	Removable part	Remarks
5. FC plate unit	CE128900 FC stopper	1	CE236400 FC plate	
6. P upper plate	PUTB2x3SN	2	ZC513400 P upper plate	
7. P shaft	⑳ CE127600 R spring CE237300 Plate 2		ZJ131600 Winding claw CE127200 Roller CE237500 Spring A CE127000 FW gear 1 CE522300 PA shaft	

D

REASSEMBLING
AND
ADJUSTING PROCEDURES

D. REASSEMBLING AND ADJUSTING PROCEDURES

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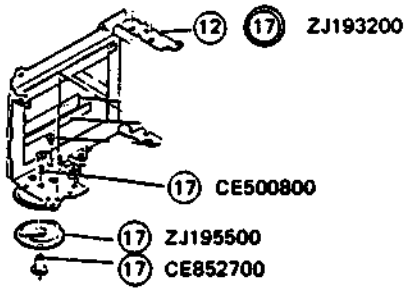
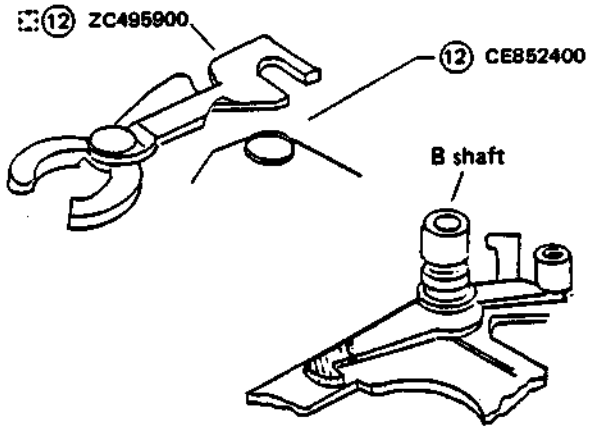
D. REASSEMBLING AND ADJUSTING PROCEDURES

I. REASSEMBLY AND ADJUSTMENT OF SHUTTER UNIT

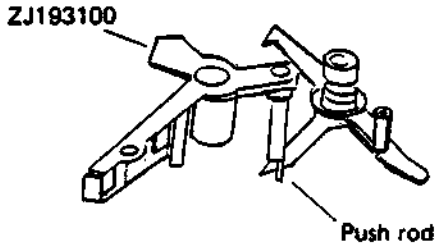
1. Reassembly of gear AM
   - Insert CE852700 (gear shaft 2) into ZJ195500 (gear AM), and tighten CE500800 (gear screw) from top of the ZJ193200 (S. frame 2).



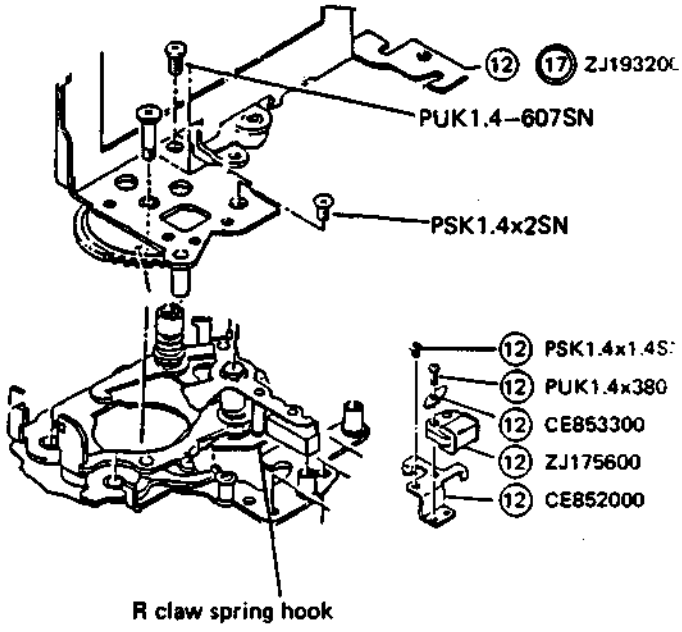
2. Reassembly of B brake lever
   - Fit B lever spring CE852400 over the B shaft with the bent part of the spring set on the side of gear A.
   - Fit the U-shaped part of B brake lever ZC495900 into the second highest groove of the B shaft and engage the B lever spring.



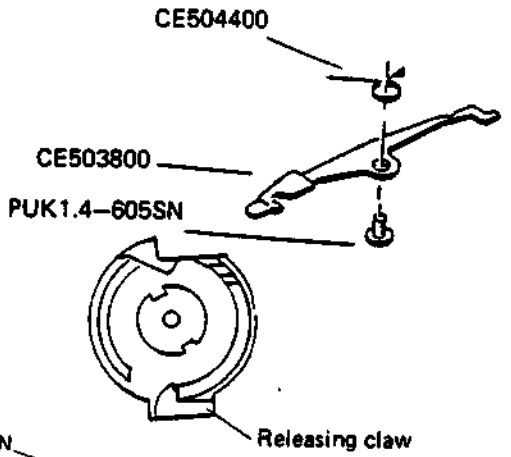
3. Reassembly of R claw
   - Fit R claw ZJ193100 into the R shaft. (The push rod of the R claw should be located as shown on the right side.)



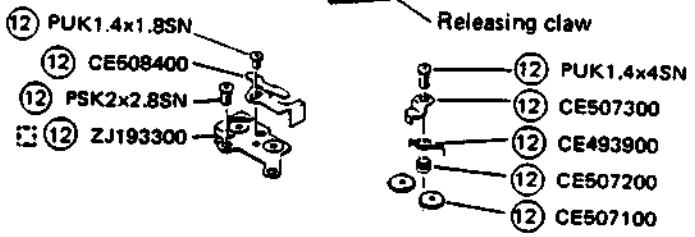
4. Bring the shutter frame into contact with S base plate.
   - Set the shutter plate while taking care not to catch the releasing claw, hook lever, etc.
   - Tighten Screws PUK1.4–607SN and PSK1.4x 2SN.
   - Engage the R spring with the R claw spring hook (groove).
5. Set the MG plate over the S frame 2.
   - Reassemble the ZJ175600 (MGunit) on the CE852000 (MG plate) and set it over the ZJ193200 (S frame 2).

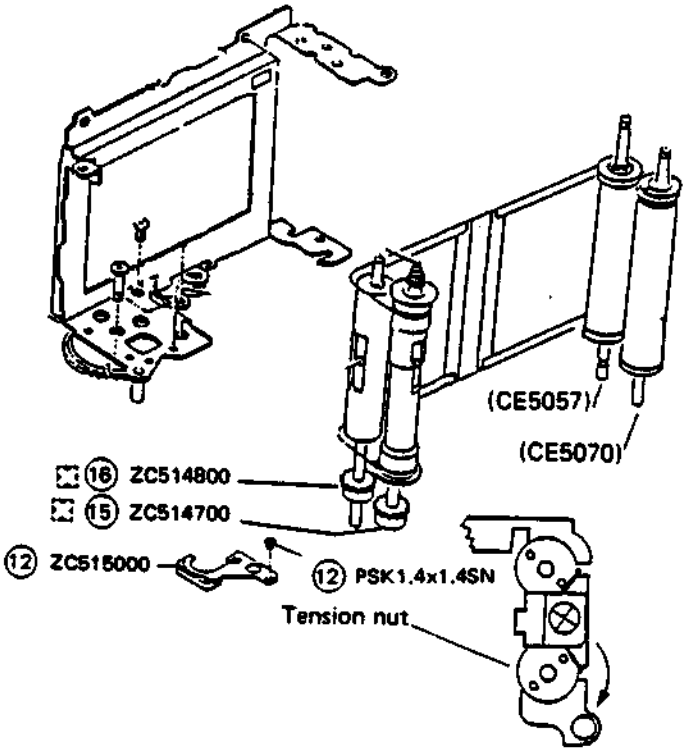


6. Reassembly of M lever 2
   - Fit M lever spring CE504400 over the shaft for M lever.
   - Fit M lever 2 CE503800 over the shaft and tighten Screws PUK1.4–605SN.
   - Engage the M lever spring.

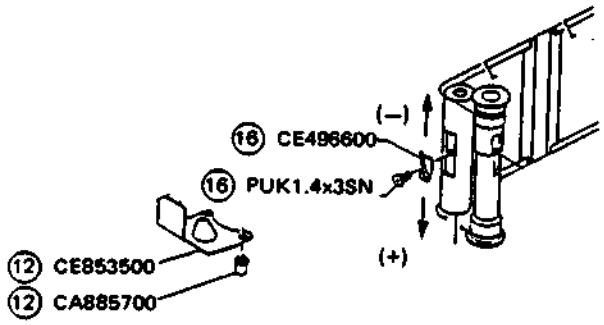


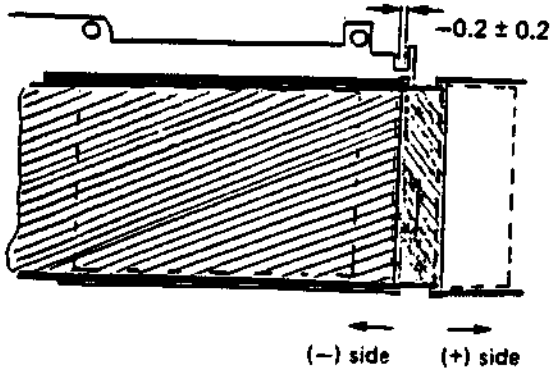
7. Reassembly of 1st and 2nd shutter blinds
   - Insert Blind shaft C CE507000 and Blind shaft D CE505700 into Shutter frame 2 ZJ193200.
   - Tighten Tension nut CE507100.
   - Fix TN shaft CE507200, T stopper CE493900 and TN lock CE507300 by tightening Screws PUK1.7x4SN.
   - Insert Tube AM ZC514700 and Tube shaft BM ZC514800 into the shutter frame 2.
   - Tentatively fix U plate R ZJ193300.
   - Fix L plate R ZC515000 with Screws PSK1.4x 1.4SN.



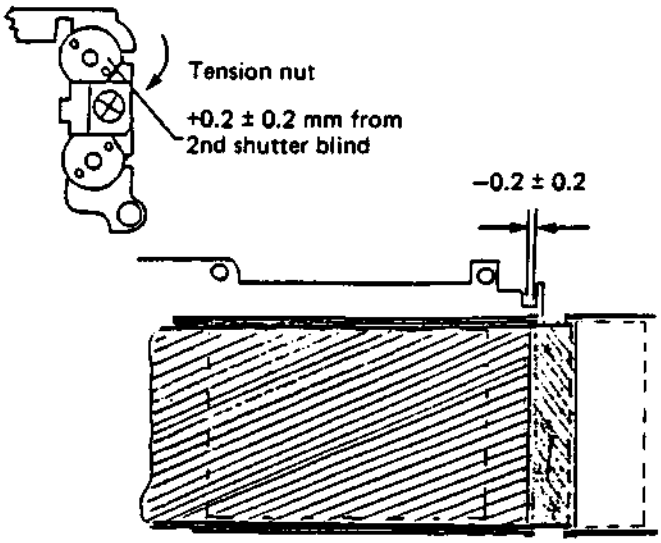


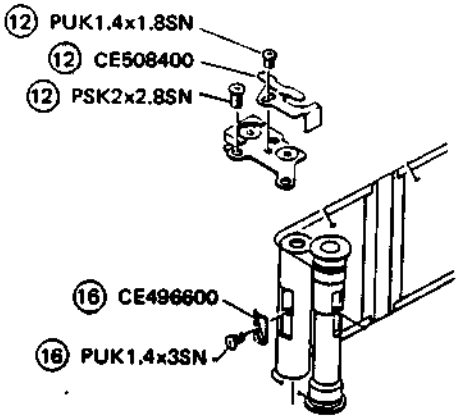
8. Positioning of 2nd shutter blind
   - Apply torque to the 2nd shutter blind (rotate the tension nut about 3 turns clockwise).
   - Remove the tube shaft BM from gear BM. Wind the 2nd shutter blind until its metal fitting is located as shown on the right side. Perform fine adjustment by moving Positioning plate CE496600.
   - Fix L plate CE509200 with B plate shaft CA885700.



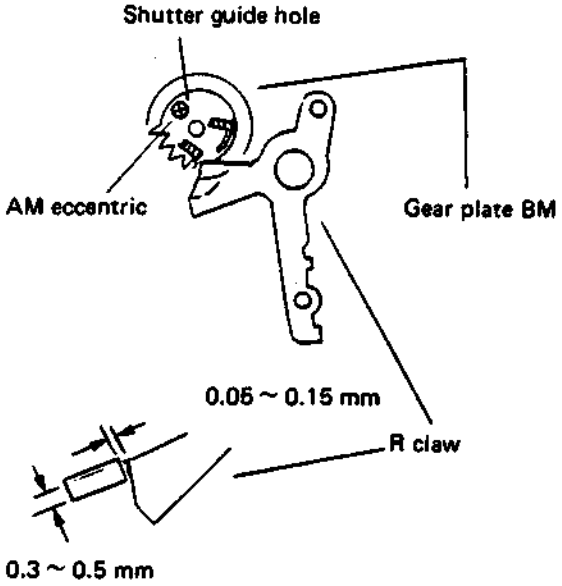


9. Positioning of 1st shutter blind.
   - ○ Apply torque to the 1st shutter blind (rotate the tension nut about 4.5 turns clockwise).
   - ○ Remove Tube AM ZC514700 from gear AM. Wind the 1st shutter blind until its metal fitting is located as shown on the right side. Perform fine adjustment by moving the positioning plate.
   - ○ Fix the U stopper CE508400 with Screw PUK1.4x1.8SN.

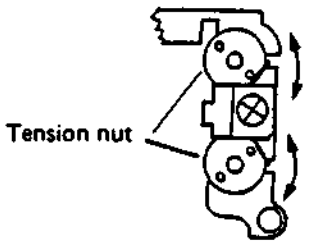




10. Adjustment of gap between R claw and gear plate BM
   - ○ Charge the shutter. (The second stage of the release claw must be engaged with the gear AM).
   - ○ Engaging depth of R claw
     Bring M holding plate 3 CE504600 into contact with the magnet and adjustment engaging depth of the R claw to 0.3 to 0.5 mm by changing position of MG plate ZJ175600.
   - ○ Gap of R claw
     Adjust the gap to 0.05 ~ 0.15 mm by turning the AM eccentric screw assembled with the gear AM through the guide hole of gear BM.
   - ○ The M holding plate must be brought into close contact with the magnet under force applied through the releasing claw by the push rod.

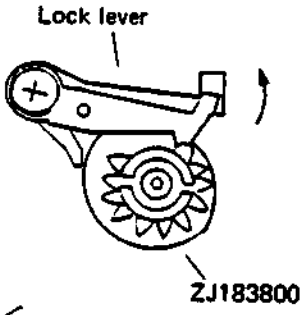


11. Adjustment of shutter blind speed
   - ○ Adjust speed of the 1st and 2nd shutter blinds by turning the tension nut.
     Standard: 10.50 ± 0.1 ms
     (at 1/1000 sec. in the Manual mode)



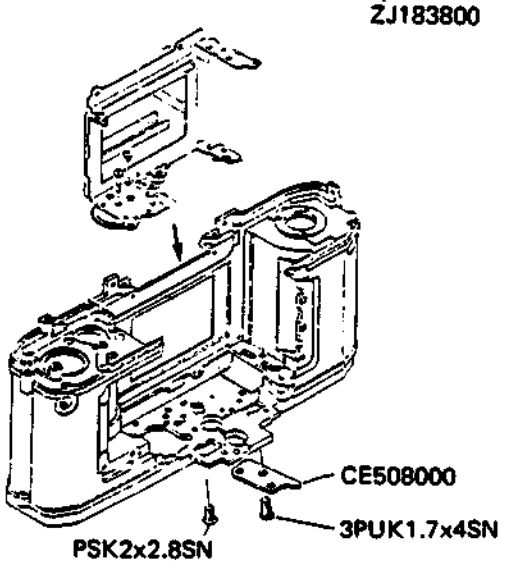
[Reassembly of shutter unit]

12. Position of No. 2 gear
   - Release the lock lever and rotate No. 2 gear ZJ183800 1/4 turn counterclockwise.

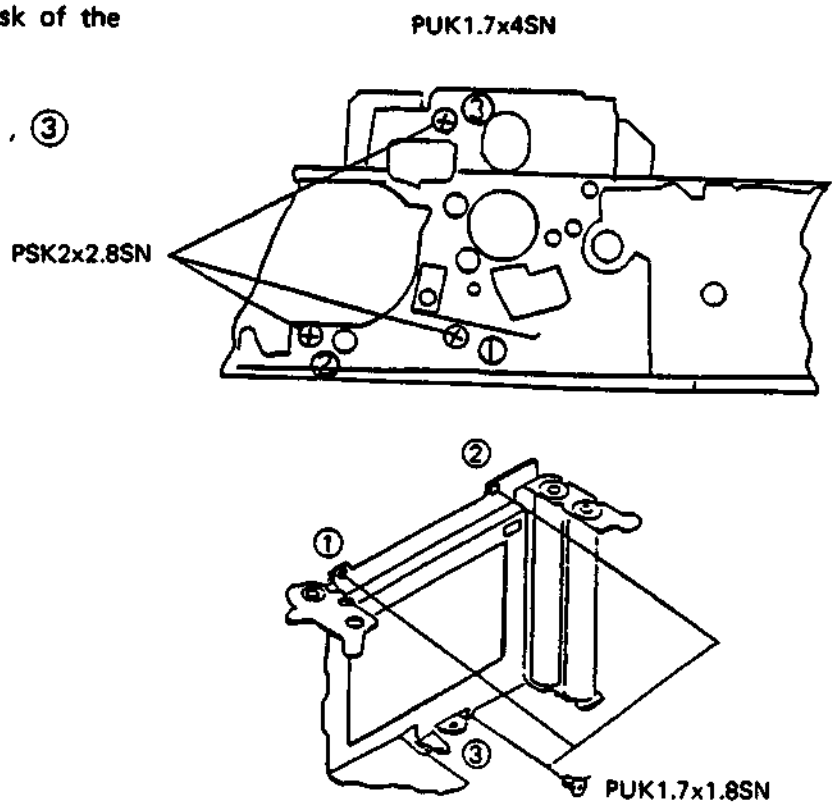


13. Setting of shutter unit
   - Charge the K plate 2 (CE551300).
   - Set the shutter unit into the camera body from above.
   - Set the shutter unit while taking care not to catch the M lever 2 CE503800.

14. Tighten the screws on the bottom of the camera body.
   - PSK2x2.8XN (x3)
   - Screw tightening sequence: ① , ② , ③
   - Reassemble S plate (CE508000) with a screw 3PUK1.7x4SN.



15. Tighten the three screws on the mask of the camera body.
   - PUK1.7x1.8SN (x3)
   - Screw tightening sequence: ① , ② , ③

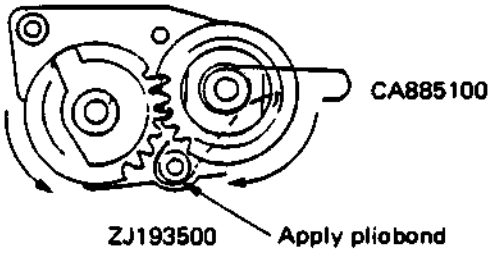


16. Reassembly of S lever 1

- Mount S lever 1 CA993900 and tighten spring shaft CA884600.

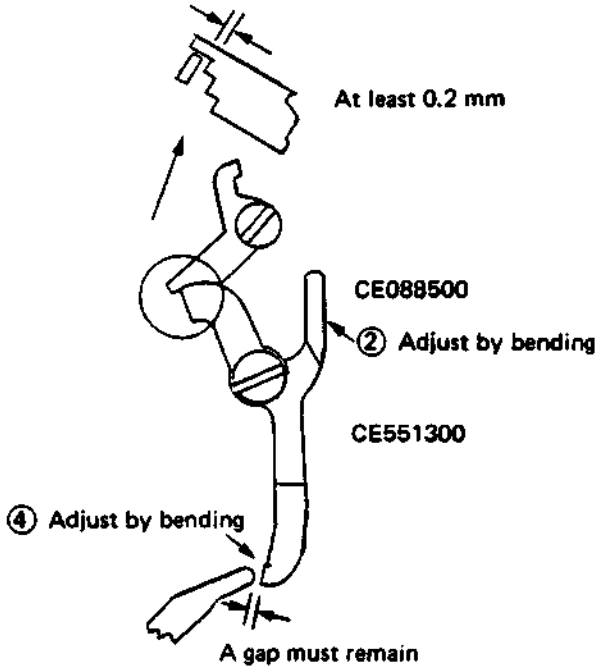
17. Reassembly of No. 4 base plate

- Engage No. 3 gear spring CA885100 with the No. 4 base plate.
- Reassemble the No. 4 base plate ZJ193500 with the shutter unit.
- Charge the wind and shutter unit before reassembly.



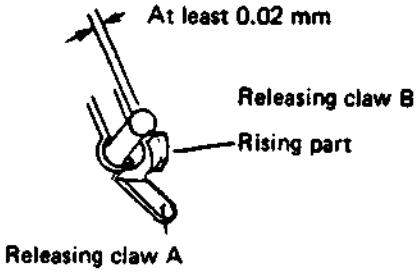
18. Gap of K plate B

- In film winding, K plate B CE551300 must be placed over the 1st stage of K plate A CE088500 with a gap of at least 0.2 mm.
- When the gap is narrower than 0.2 mm, adjust it by bending the K plate B. (The K plate A must not penetrate into the K plate B.)
- After completing film winding, a gap must remain between the K plate B and release claw.
- If no gap remains, form a gap by bending the K plate B.



19. Preparatory run of shutter blind

- Return the KM lever to it's initial stage by film winding.
- Shutter blind should make preparatory run when carefully turn the K plate A to 3rd stage from 1st stage of K plate B.
- When the shutter blind does not make preparatory run, adjust the K plate B by bending.
- When above adjustment is not effective, adjust by bending the rising part of the release claw B.

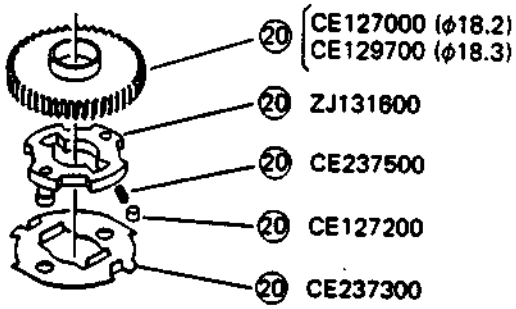


II. REASSEMBLY AND ADJUSTMENT OF FILM WIND UNIT

1. Reassembly of Film Advance Unit

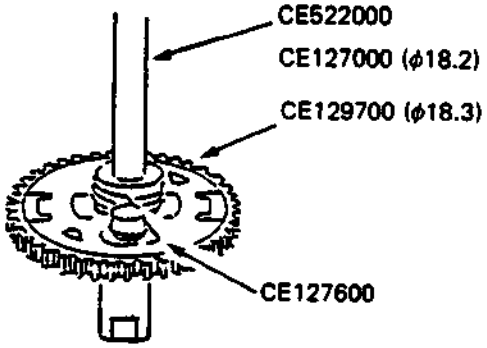
1-1. Reassembly of FW gear CE127000 and roller

- Set the FW gear 1 upside down and reassemble the following parts 1 through 4 in this sequence:
  1. FW claw ZJ131600
  2. Roller CE127200
  3. R spring A CE237500
  4. Spring 2 CE237300



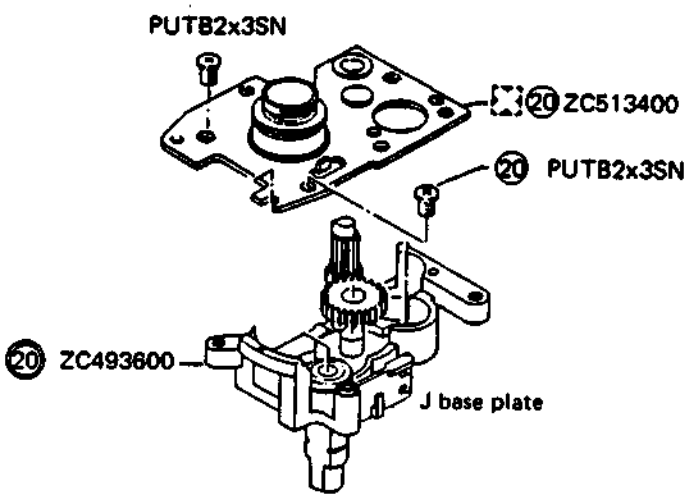
1-2. Reassembly of FW shaft

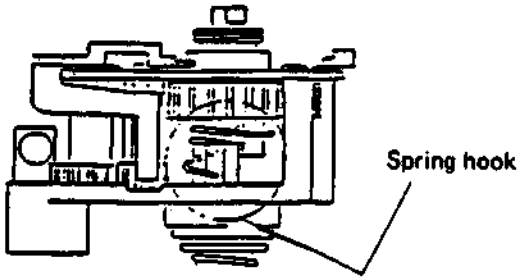
- Insert P-FW pin CE522300 into P-FW shaft CE522000 until its projection becomes flush.
- Push P-FW shaft CE522000 into the FW gear unit.
- Engage Returning spring CE127600 as shown on the right side.



1-3. Reassembly of FW shaft unit

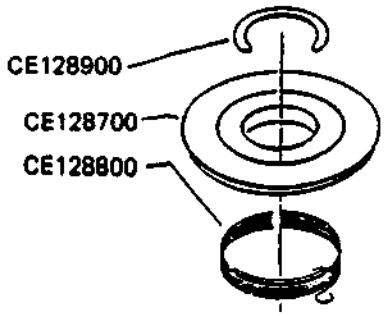
- Insert the FW shaft unit under the FW unit. (P base plate)
- Engage the returning spring with the convexity of the P base plate and locate the spring hook of the FW claw on the right side of the P base plate.
- Reassemble the U base plate.





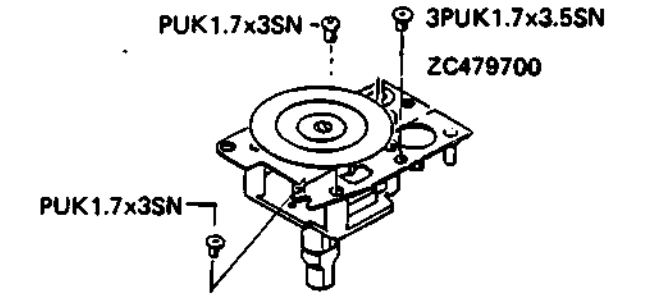
1-4. Reassembly of FC upper gear

- Engage FC spring 2 CE128800 with the projection of U base plate. Apply the torque to FC upper gear CE128700 by overriding the projection and set the FC stopper CE128900 in position.



1-5. Reassembly of film advance unit

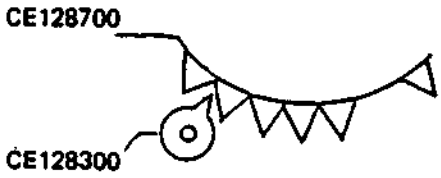
- Reassemble the film advance unit into the camera body. Tighten three Screws.
- Engage P-FC spring 2 CE521800 as shown on the right side.



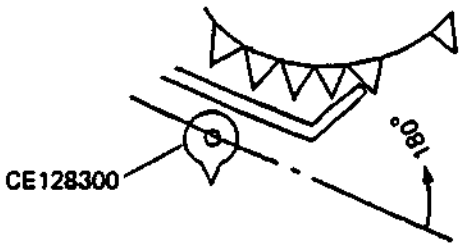
2. Adjustment of FC Upper Gear

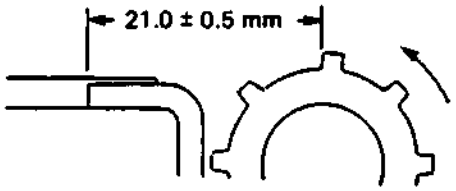
2-1. Positional check and adjustment of FC gear

- At the first film winding, FC lower gear CE128300 must be engaged with the fourth tooth of FC upper gear CE128700.

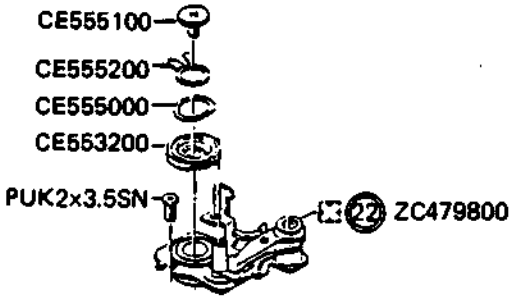


- After completing film advance, the projection of the FC lower gear must not be located within 180° on the side of the FC plate. Position of the FC lower gear can be adjusted after detaching No. 1 gear CE553200.



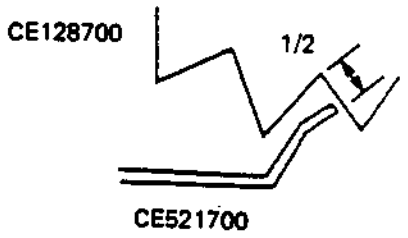


When No. 1 gear is detached for adjustment, check the sprocket for its proper position.

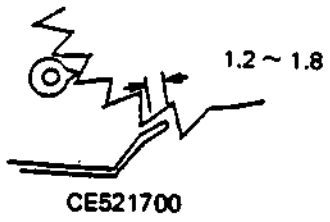


2-2. Engagement adjustment of FC plate

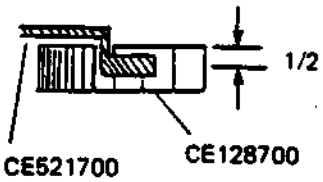
- When engagement of P-FC plate CE521700 is less than 1/2 of the tooth of the FC upper gear after completing film winding, adjust the engagement depth by bending the P-FC plate.



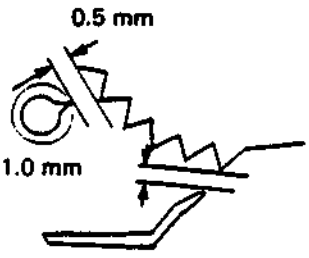
- The FC upper gear must have a feeding margin of 1.2 to 1.8 teeth. Adjust so as to obtain such a margin by bending the FC plate.



- The P-FC plate must have an engagement depth of at least 1/2 tooth thickness of the FC upper gear.
  If the engagement depth is shallow, adjust the bending the P-FC plate.



- The gap between the P-FC base plate and FC upper gear must be at least 1.0 mm along the whole circumference of the FC upper gear when the rear cover is opened gently. The gap around the lower gear must be at least 0.5 mm.
- Bond FC plate CE236400 to the FC upper gear. All the characters must be located within the range of the index. When the rear cover is opened, character "S" must be aligned with the index.



3. Reassembly of D. frame

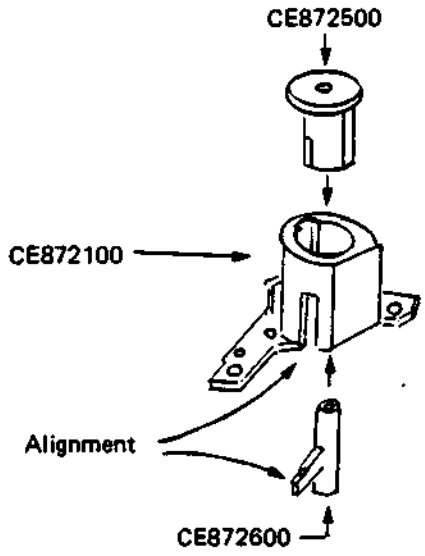
(1) Reassemble the Release button CE872500 into the D. frame CE872100.

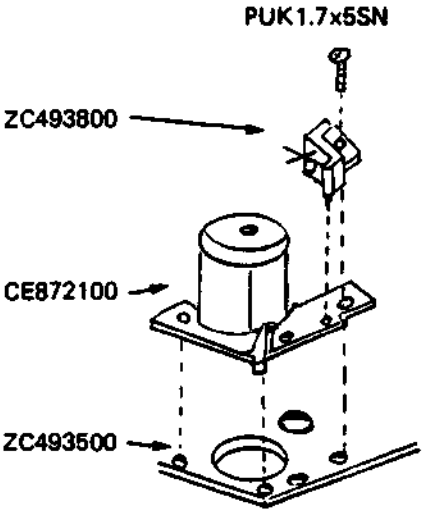
(2) Insert the D connector CE872600 into the bottom side of release button. (D screw CE872700 must be located on the top of D connector).

(3) Reassemble the D. frame ass'y on the P upper plate ZC493500.

(4) Reassemble the D contact ZC493800 on the D. frame, and tighten the screw PUTB1.7x5SN.

- Position of D contact ZC493800
  D contact 1 must be located on the D contact 2.



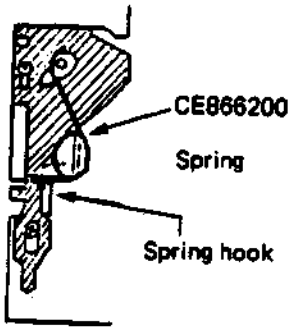


Ⅲ. REASSEMBLY AND ADJUSTMENT OF FRONT CASTING UNIT

1. Check and Adjustment of Side Plate R

○ Spring must be located in position when the Mirror frame ZJ192500 is shifted to side plate L.

(Side plate R)
ZJ192300



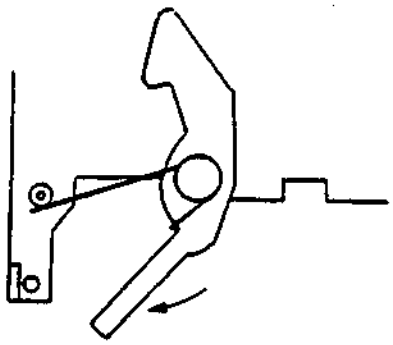
2. Check and Adjustment of Side Plate L

C rising hook

2-1. Operation check of C rising hook

○ The C rising hook must move by its own weight.

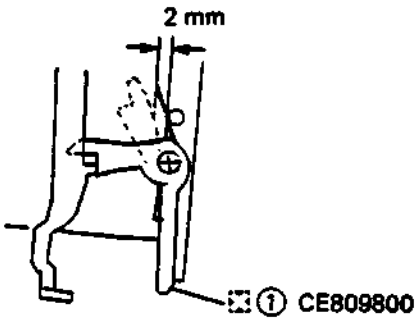
○ Move the C rising hook two or three times in the direction indicated by arrow and make sure that it can return smoothly.



2-2. Operation check of D hook

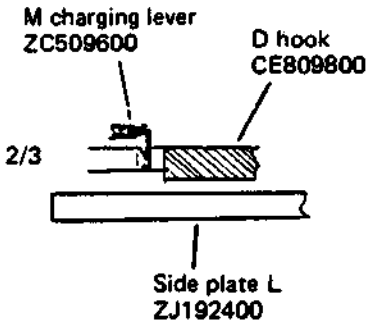
○ D hook CE809800 must move by its own weight.

○ It must be capable of moving to a point 2 mm as measured from spring shaft 1.



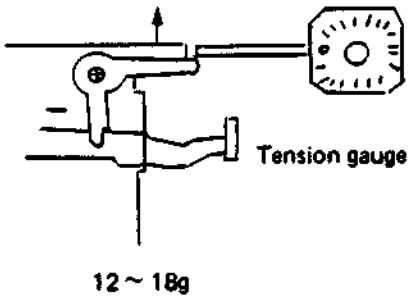
2-3. Engagement check of D hook

- Engagement depth between M charging lever ZC509600 and D hook must be at least 2/3 of thickness of the D hook.



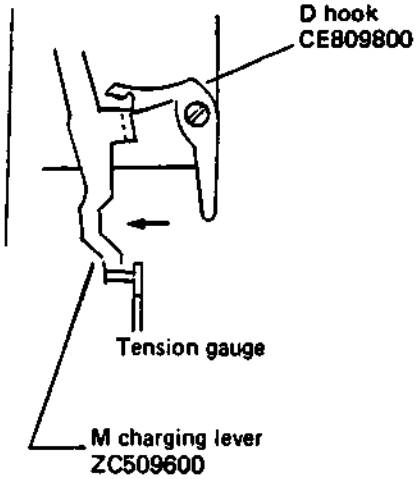
2-4. Following force of D hook

- The D hook must follow with a force of 12 to 18g (force required to stop the D hook just before it becomes contact with the M charging lever).



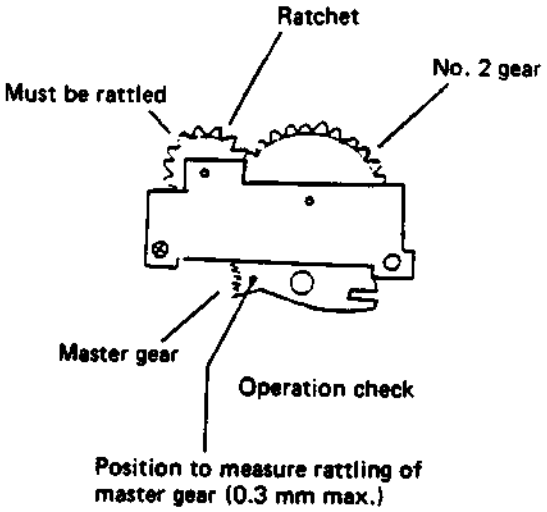
2-5. Force required to set M charging lever

- When the F lever ZC509500 is engaged with the C rising hook CE800600, the D hook must be engaged with the M charging lever by a force of 900g max.

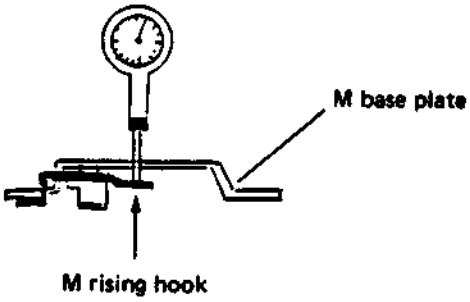


2-6. Operation check of M base plate

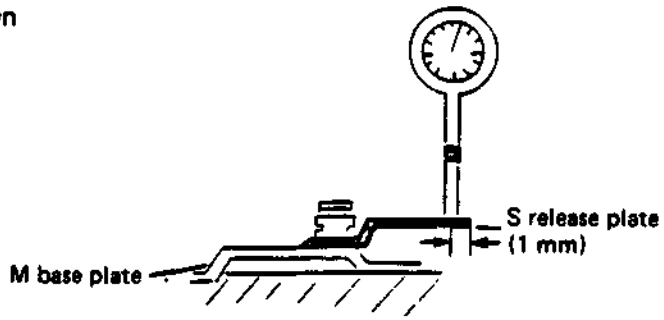
- Operation check of gear
  The gear must be turned smoothly by turning the master gear.
- The gear must be rattled when the ratchet is moved up and down.
- Thrust rattling of master gear:
  0.3 mm max. at the gear tip



- Thrust rattling of M rising hook:
  0.3 mm max. at the tip of the hook

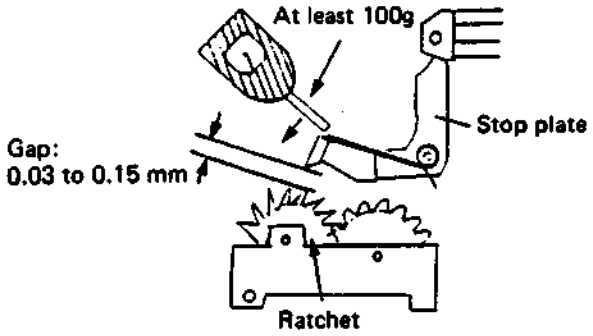


- The S release plate must move by its own weight.
- Thrust rattling of S release plate:
  0.4 mm max. at the tip of its leg



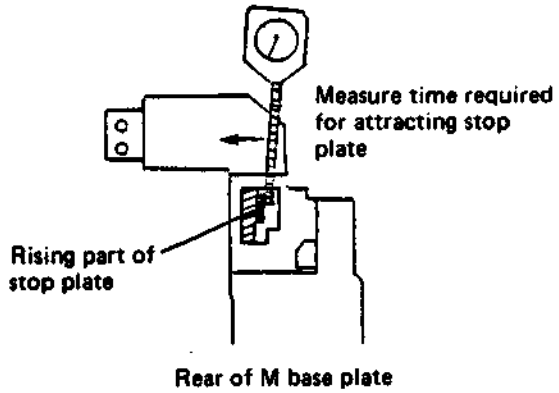
- The stop plate must move by its own weight.
- The gap between the ratchet and stop gear must be 0.03 to 0.15 mm.
  It can be adjusted by moving MG3.
- The stop plate must have attracting force of at least 100g.

Procedures to measure gap and attractive force of stop plate



- Force required to charge stop plate
  80 ± 10g as measured at the rising part on the rear of the M base plate.

Method to measure charging force

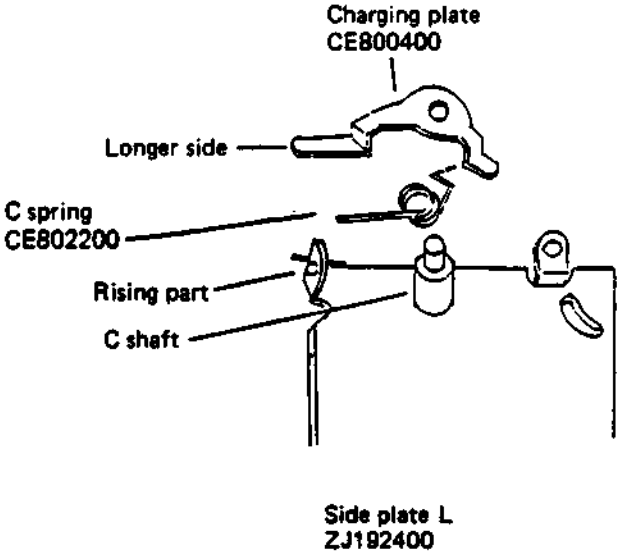


- Repulsive voltage of MG3
  MG3 must be repulsive at a voltage of at least 2.2V (OK when it is repulsive at 2.2V).

2-7. Setting of M base plate

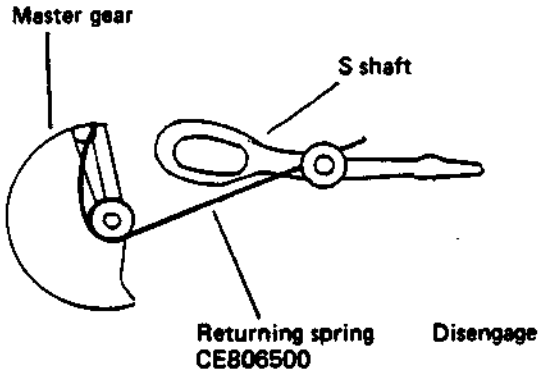
(1) Set charging plate CE800400 in position.

- Engage the charging spring with the rising part of Side Plate L ZJ192400.
- Place the longer side of Charging plate CE800400 under the rising part of the side plate L.
- Engage the charging spring with the charging plate.



(2) Disengage Returning spring CE806500 from the S shaft.

(3) Slightly move the master gear so that the rising part of Diaphragm lever ZC509500 can be set in position.

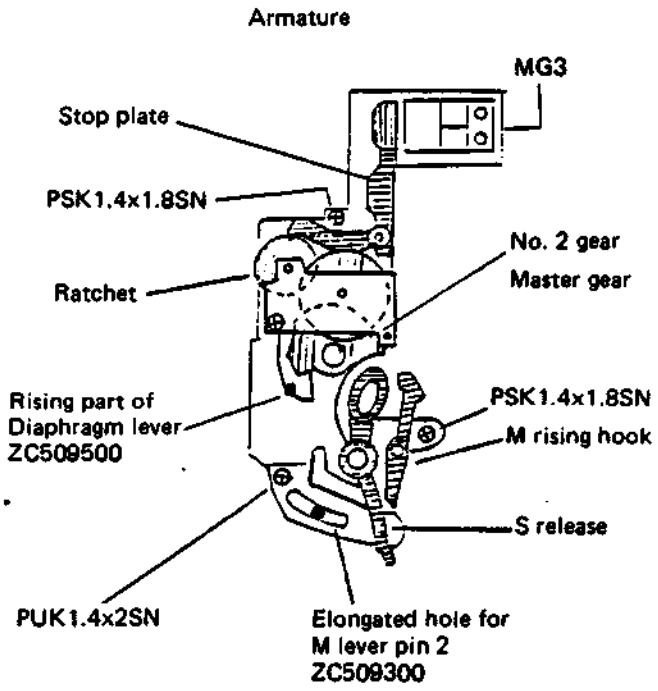


(4) Align the elongated hole side of the M lever with the end face.

(5) Insert the pin of M lever ZC509300 into M base plate ZC477400.

(6) Insert the rising part of Diaphragm lever ZC509500 into the M base plate.

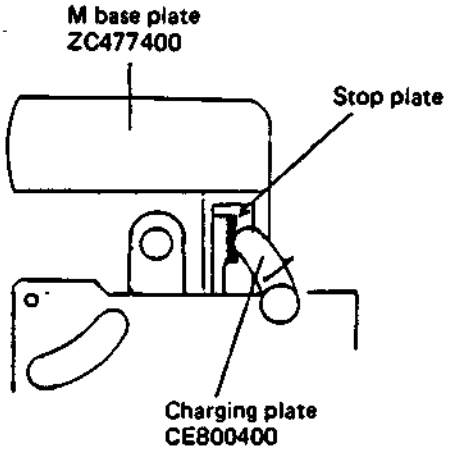
(7) Insert M lever pin 2 into the elongated hole of the S release and M rising hook.



(8) Adjust position of the M base plate until it is placed snugly in position and fix it by tightening the screw.

(9) Engage Charging plate CE800400 with the rising part of the stop plate.

- After loosening Screw PSK1.4x1.8SN, make M base plate ZC477400 override while allowing it to escape a little.
- After the overriding, tighten the screw to prevent the charging plate from detaching.

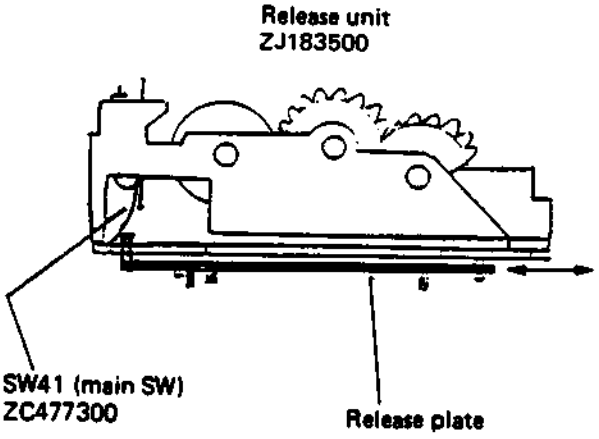


(10) Engage Returning spring CE806500 with the S shaft.

(11) Check the gear of the M base plate for its motion.

2-8. Operation check of release unit

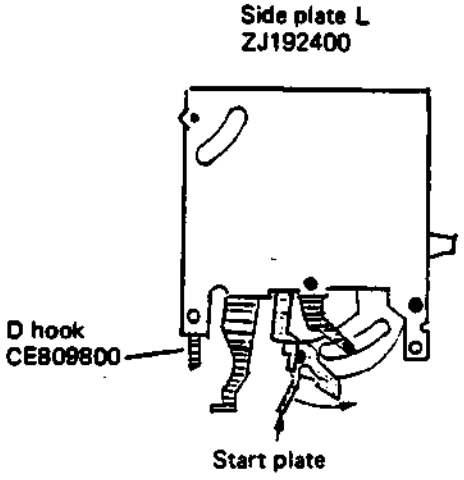
- The release plate must move smoothly.



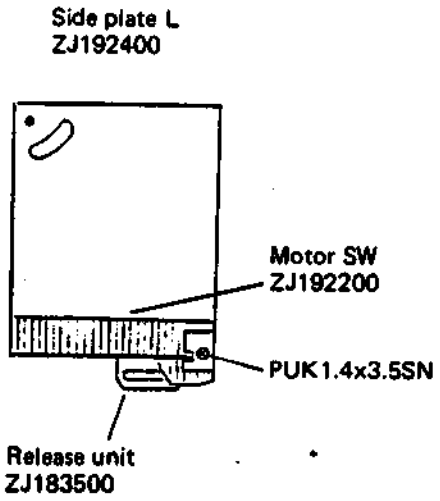
2-9. Setting of Release unit ZJ183500 and Motor SW ZJ192200

(1) Fell down the start plate in the direction indicated by arrow on the right side.

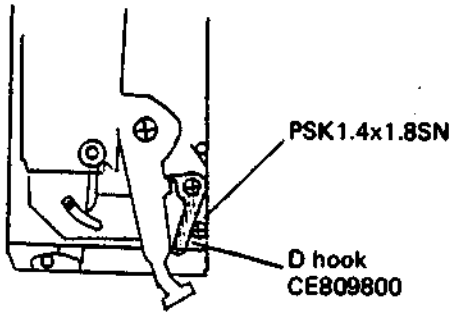
(2) Set SW41 (main SW) ZC477300 of Release unit ZJ183500 on the side of D hook CE809800 of Side plate L ZJ192400, and attach the release unit to the side plate L.



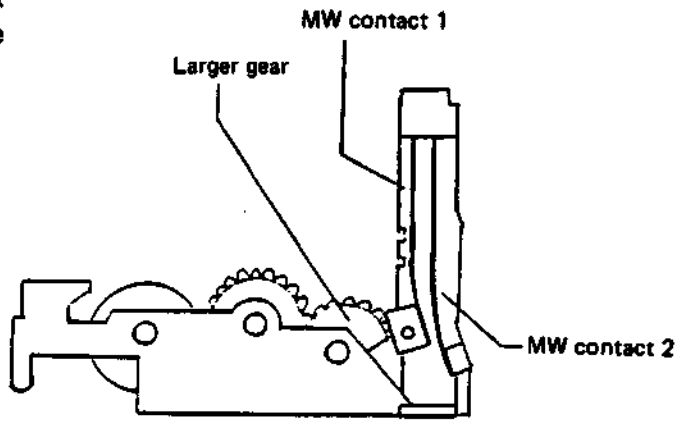
(3) Mount Motor SW ZJ192200 on Release unit ZJ183500.



(4) Tighten Screw PUK1.4x3.5SN on Motor SW ZJ192200.
After allowing D hook CE809800 a little, tighten Screw PSK1.4x1.8SN.



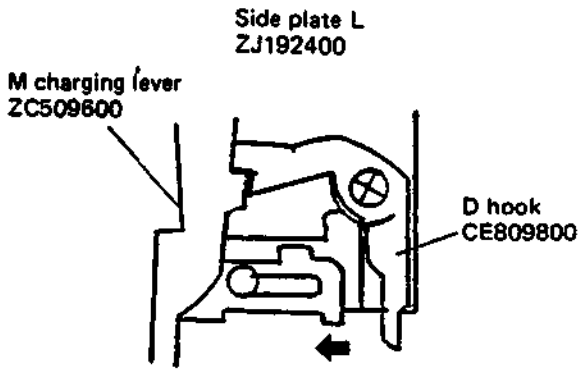
(5) Make sure that MW contact 1 is in contact with the tooth of larger gear and pushing the MW contact 2 as shown on the right side.



2-10. Operation check of M base plate ZC477400 and Release unit ZJ183500 after setting

- ○ D hook CE809800 must move smoothly without fail.

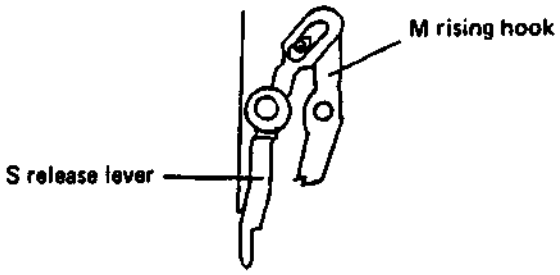
- ○ Force required to disengage D hook
- · 110g in stop down condition
  With the M charge ZC509600 set in position, depress the start plate to place the mirror at the UP position. In this condition, measure force required to push the D hook in the direction indicated by arrow.
- · 140g in diaphragm open condition
  With the M charging lever set in position, fix Diaphragm lever ZC509500 to prevent it from rising. In this condition, depress the start plate to place the mirror at the UP position. Measure force required to push the D hook in the direction indicated by arrow.



- ○ Operation check of M charging lever ZC-509600
- · When the M charging lever is operated, it must move smoothly without abnormal noise.
- · Set the M charging lever in position and disengage D hook CE809800. When the M charge is released gently, it must return to its initial position.
- · Force required to disengage D hook 500 ± 30g.

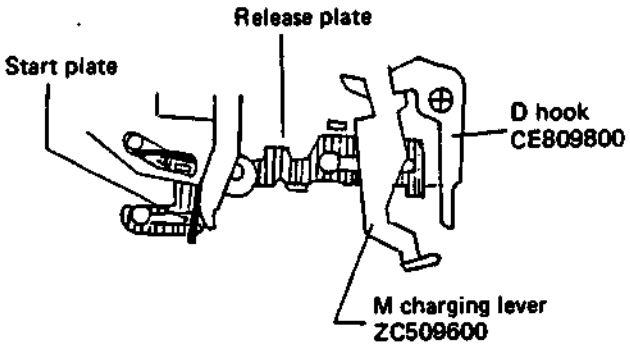
○ Operation check of M rising hook

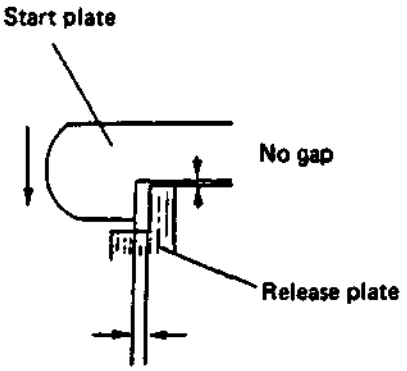
- The M rising hook must move smoothly over the entire stroke.
- When the M charging lever ZC509600 is set in position, the start plate must secure the release plate without fail.
- Force required to disengage M rising hook:
  25 ± 5g



○ Operation check of start plate

- Before setting M charge ZC509600 in position, the gap between the start plate and release plate must be at least 0.3 mm
- After M charging lever ZC509600 is set in position, the release plate must be fully engaged with the start plate.
- The start plate must be in close contact in the direction indicated by arrow.

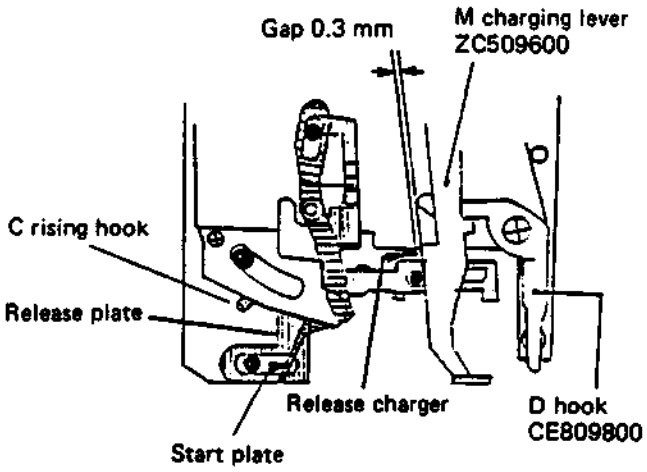




Gap at least 0.3 mm

○ Operation check of release charger

- The release charger must be moved by operation of M charging lever ZC509600.
- When the M charger is returned to its initial position by releasing D hook CE809800, the release charger must return smoothly to its initial position under spring force.
- The gap between the release charger and M charging lever must be at least 0.3 mm.



○ Operation check of C rising hook

- When the release plate is operated by releasing the start plate, the C rising hook must be disengaged and Diaphragm lever ZC-509500 must start operating.
- Force required to operate the C rising spring:
  30 ± 10g

○ Operation check and adjustment of Motor SW ZJ192200

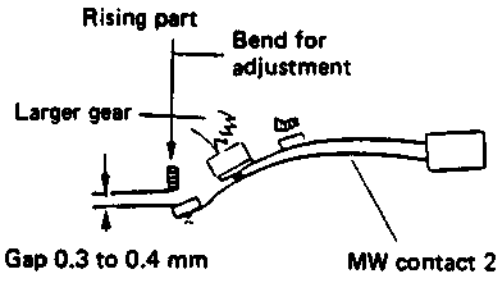
* Charge the M charging lever

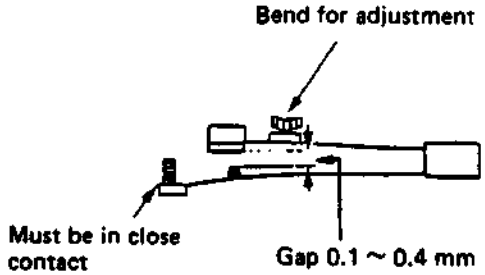
- The gap between the MW contact 2 and MW base plate must be 0.3 to 0.4 mm.
- If not, adjust by bending the rising part of the base plate.

* Then, set up the stop down condition by pushing the release plate.

- The gap between the MW contact 1 and MW contact 2 must be 0.1 to 0.4 mm.
- If not, adjust by bending the rising part of the base plate.

* Hold the base plate securely for bending the rising part.





2-11. Adjusting the side plate L

○ MT jig (KC-CE8101)

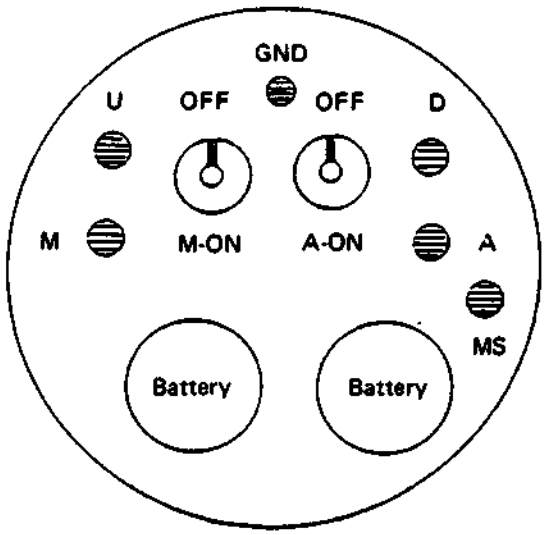
(1) To adjust the side plate L, use MT jig (M-Timing Jig).

(2) The adjustment of the side plate L includes the following four procedures:

1. Timing of starting mirror rise.
2. Timing of starting aperture lever movement.
3. Motor SW short-circuiting timing.
4. Motor SW timing of start winding.

(3) Description of the MT jig.

(KCCE8101)



○ GND: Conductivity with the camera body
M: Mirror rise signal input
A: Aperture lever starting signal input
U: Motor switch short-circuit signal input
D: Motor switch winding start signal input
MS: GND for inputting main switch signal

○ For SW
A-ON: Aperture lever signal input
M-ON: Mirror signal input
OFF: To be used when checking other switch signal inputs

(4) Setting the MT jig

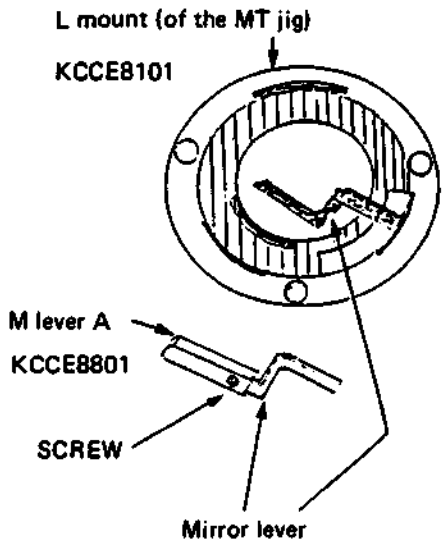
Use M lever A (KCCE8801) for OM-40

1. Set M lever A (KCCE8801) on the mirror lever.
   - Hold the mirror lever with hand and fasten with the screw on the M lever A. Do not screw too tightly.
   - Never attempt to bend the mirror lever
2. Insert the mirror lever of the MT jig between the mirror and the cover plate by using Bulb mode of the camera.
   - Never attempt to bend the mirror lever (for the on/off timing of the switch is lagged, and measurement would be wrong).
3. Even if the mirror lever does not move smoothly, it is not in trouble (but it should be light in movement).

   Keep the switch turned off while not in use.

   The standard value may differ from the theoretical one depending on the ON timing of the switch.

   This repair manual shows the standard when using the MT jig.



(A) If the M2 circuit board is mounted on the camera body:

- Remove the top cover.
- Input the M. SW signals through the M2 circuit board.
- After removing the front plate from the camera body, supply power to the M2 circuit board.

A-1. Adjustment of the timing of starting mirror rise.

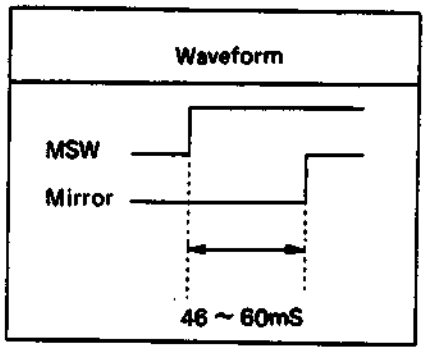
- Time from turning on the M. SW to start of mirror rise; 46 ~ 60 mS (or longer)
- Measuring method

(1) Set the MT jig on the B mount.
(2) Connect the Synchro-scope to M. SW signal input terminals as shown below:
- Probe ⊕ . . . M. SW terminal of the camera body
  Probe ⊖ . . GND of the MT Jig

(3) Connect the Synchro-scope to mirror signal input terminals as shown below:
- Probe ⊕ . . . Terminal M of the MT Jig
  Probe ⊖ . . GND of the MT Jig

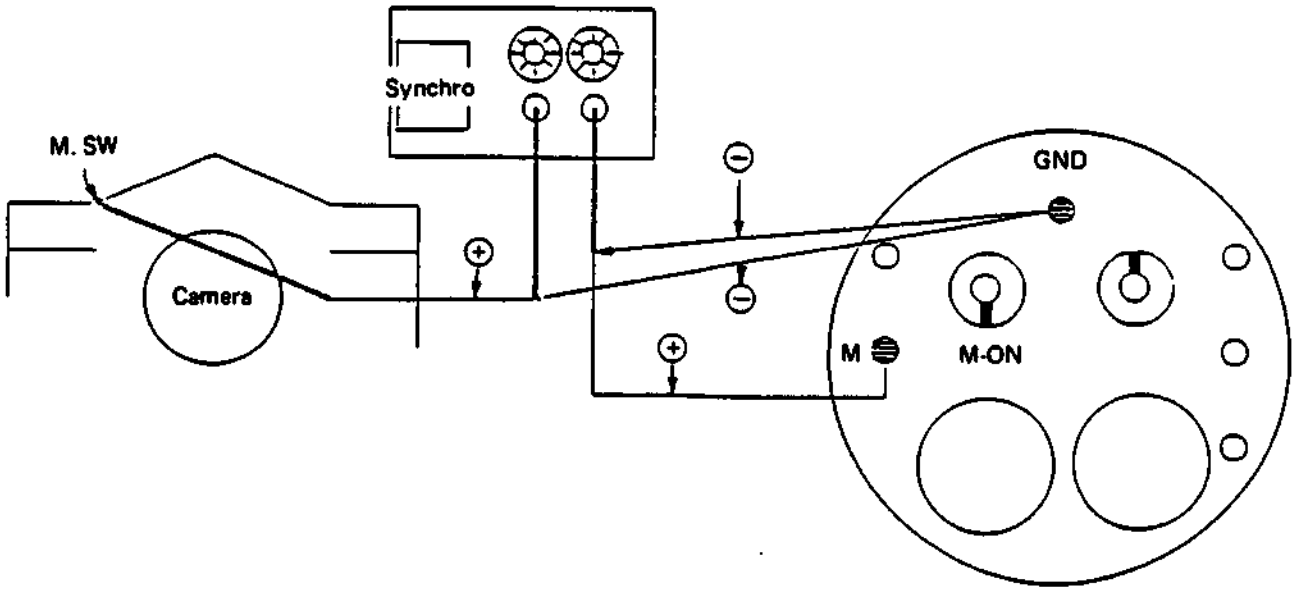
(4) Set the synchro-scope.
- 20 ms, 0.2V (1:10), SINGLE
- Set synchroscope Trg at the M. SW.

(5) Turn on the SW "M" of the MT Jig.
(6) Set the shutter dial to manual 1/60 or bulb.
(7) Measure the time after releasing the shutter several times.



- Adjusting
  - Rearrange the M. SW timing. (In this case, the timing of the aperture lever is also lagged. Rearrange it.)

Wiring diagram



A-2. Adjusting the timing of starting aperture lever movement

- Time from turning on the M. SW to start of aperture lever: 11 ~ 16ms

- Measuring method

(1) Set the MT jig on the B mount.

(2) Connect the Synchro-scope to M. SW signal input terminals as shown below:
- Probe ⊕ ... M. SW terminal of the camera body
  Probe ⊖ .. GND of the MT jig

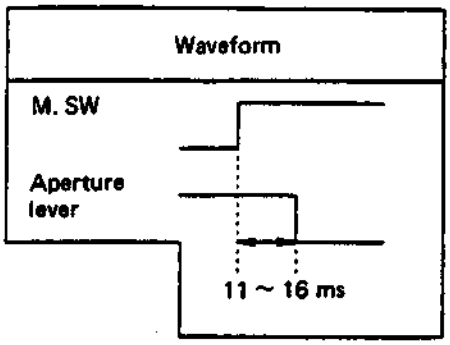
(3) Connect the Synchro-scope to aperture lever signal input terminals as shown below:
- Probe ⊕ ... Terminal A of the MT jig
  Probe ⊖ .. GND of the MT jig

(4) Set the synchro-scope.
- 5ms, 0.2V (1:10), SINGLE
- Set synchroscope Trg at the M. SW

(5) Turn on the SW "A" of the MT jig.

(6) Set the shutter dial to manual 1/60 or bulb.

(7) Measure the time after releasing the shutter several times.



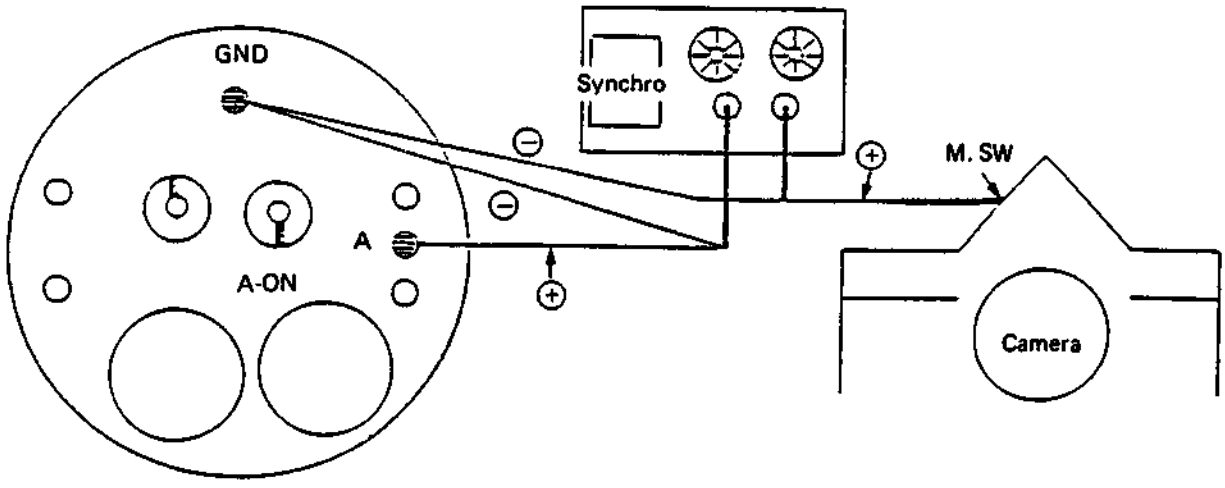
- Adjusting

(1) When the time till the start of the aperture lever is shorter:
- Replace the release plate with No. 3.
- Slightly move the mounting position of the release plate to backward or forward.
- Adjust the M. SW ON timing while observing the timing of starting mirror rise.

(2) When the time is longer:
- Slightly move the mounting position of the release plate to backward or forward.
- Adjust the M. SW ON timing while observing the timing of starting mirror rise.

* Be sure to check the mirror rise timing after adjusting as above.

* Wiring diagram



A-3. Adjusting Motor SW short-circuit timing (M-UP signal)

- Time required from turning on the M. SW until the M contact 1 of the Motor SW is short-circuited to the camera body: 15 ms or less.

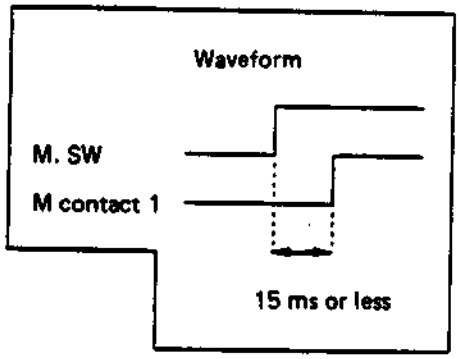
- Measuring method

(1) Remove the lower cover (CB812000)
(2) Connect a lead wire to the M contact 1.
(3) Connect the camera body to the GND of the MT jig with alligator clip.
(4) Connect the Synchro-scope to the M. SW signal input terminals as shown below:
   - Probe ⊕ ... M. SW terminal of the camera body
   Probe ⊖ .. GND of the MT jig
(5) Connect the Synchro-scope to the M contact 1 signal input terminals as shown below:
   - Use an alligator clip to connect the M contact 1 with the terminal of the MT jig.
   - Probe ⊕ ... Terminal U of the MT jig
   Probe ⊖ .. GND of the MT jig

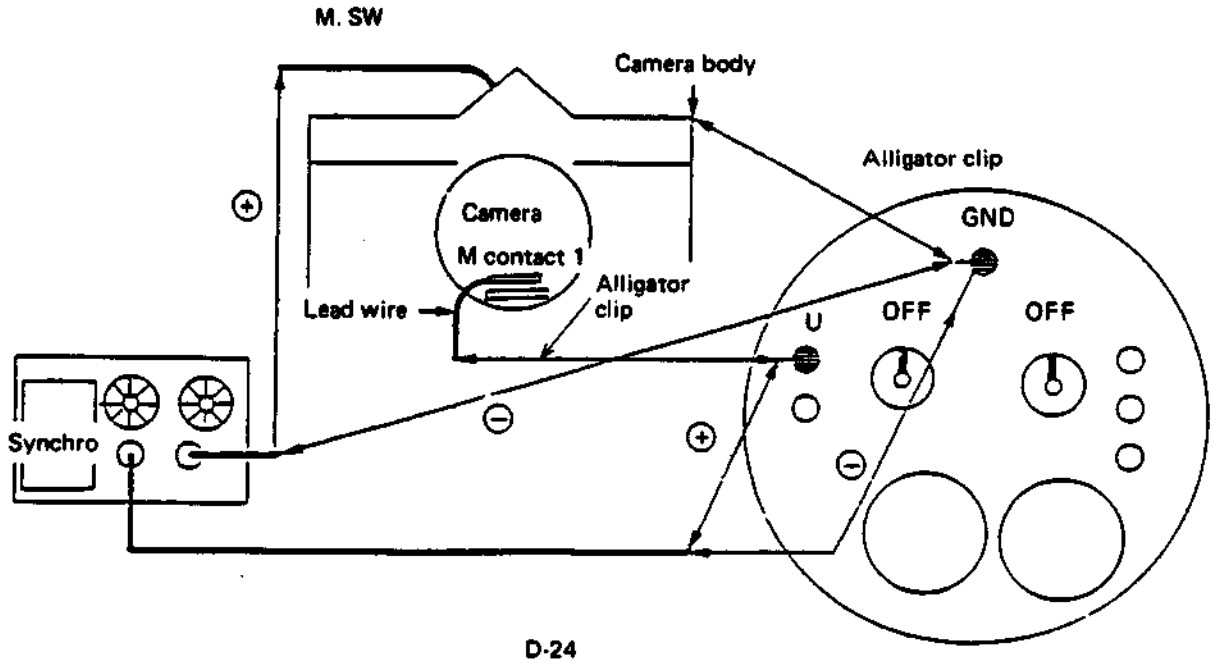
- Adjusting

(1) Remove the front plate and bend the bent portion of the Motor SW plate.
(2) (M contact 1 can be bent instead)
(See D-20)

(6) Set the synchro-scope.
   - 10 ms, 0.2V (1:10). SINGLE
   - Set synchroscope Trg at the M. SW.
(7) Turn off the SW of the MT jig.
(8) Set the shutter dial to manual 1/60.
(9) Release the shutter and measure the time.



* Wiring diagram



A-4. Adjusting the Motor SW timing of start winding. (M-DOWN signal)

- Time required from disconnection of short-circuited M contact 1 and camera body till contacting between M contacts 1 and 2: 2 ~ 6 ms.

- Measuring method

(1) Remove the lower cover (CE812000)
(2) Connect lead wires to the M contacts 1 and 2.
(3) Connect the camera body and the GND of the MT jig with alligator clip.
(4) Connect the Synchro-scope to the M contact 1 signal input terminals as shown below:
  - Use an alligator clip to connect the M contact 1 with the terminal U of the MT jig.
  - Probe ⊕ ... Terminal U of the MT jig
    Probe ⊖ .. GND of the MT jig

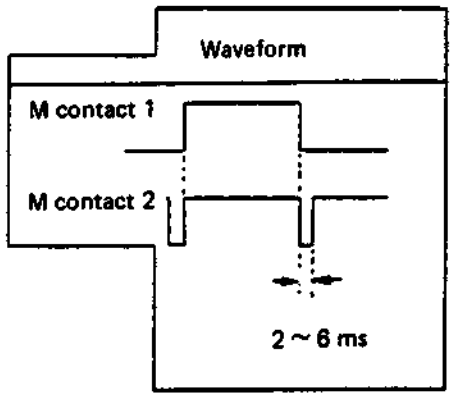
- Adjusting

(1) Remove the front plate and bend the bent portion of the Motor SW plate.
(2) (M contacts 1 and/or 2 can be bent instead) (See D-20)

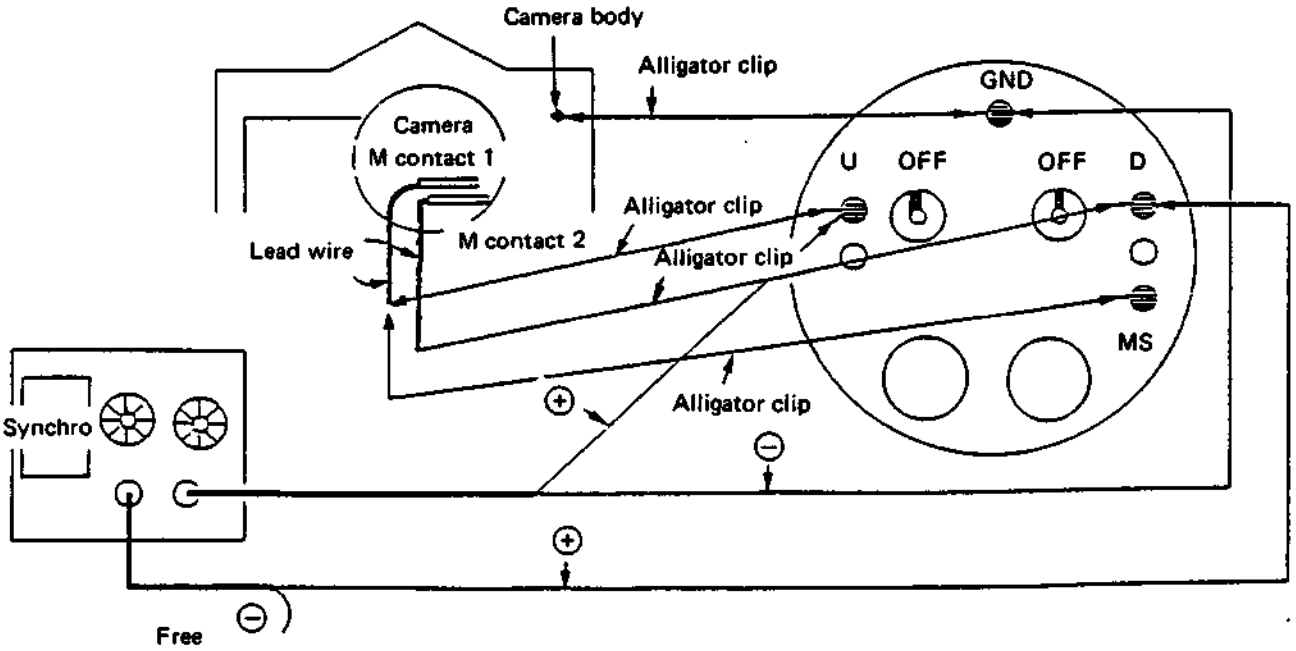
(5) Connect the Synchro-scope to the M contact 2 signal input terminals as shown below:
  - Use an alligator clip to connect the M contact 1 with the MS of the MT jig and the M contact 2 with the D of the MT jig.
  - Probe ⊕ ... Terminal D of the MT jig
    Probe ⊖ .. Keep free

(6) Set the synchro-scope.
  - 20 ms, 0.2V (1:10), SINGLE
  - Set synchroscope Trg at the M contact 2.
  - Set the Trg position on the left edge of the screen to observe the whole waveform.

(7) Turn off the MT jig.
(8) Set the shutter dial to mechanical 1/60.
(9) Release the shutter and measure the time.



* Wiring diagram



(B) If the M2 circuit board is not mounted, with the front plate exposed:

(1) Since M. SW terminal of the M2 circuit board is not available, use the M. SW of the front plate directly.

(2) Therefore, it is necessary to input the M. SW signal to the MT jig by alligator clip.

(3) Other procedures remain unchanged from item (A) above.

B-1. Adjusting the timing of starting mirror rise

○ The points which differ from item (A)

(1) Connect the Synchro-scope to the mirror signal input interminals as follows:

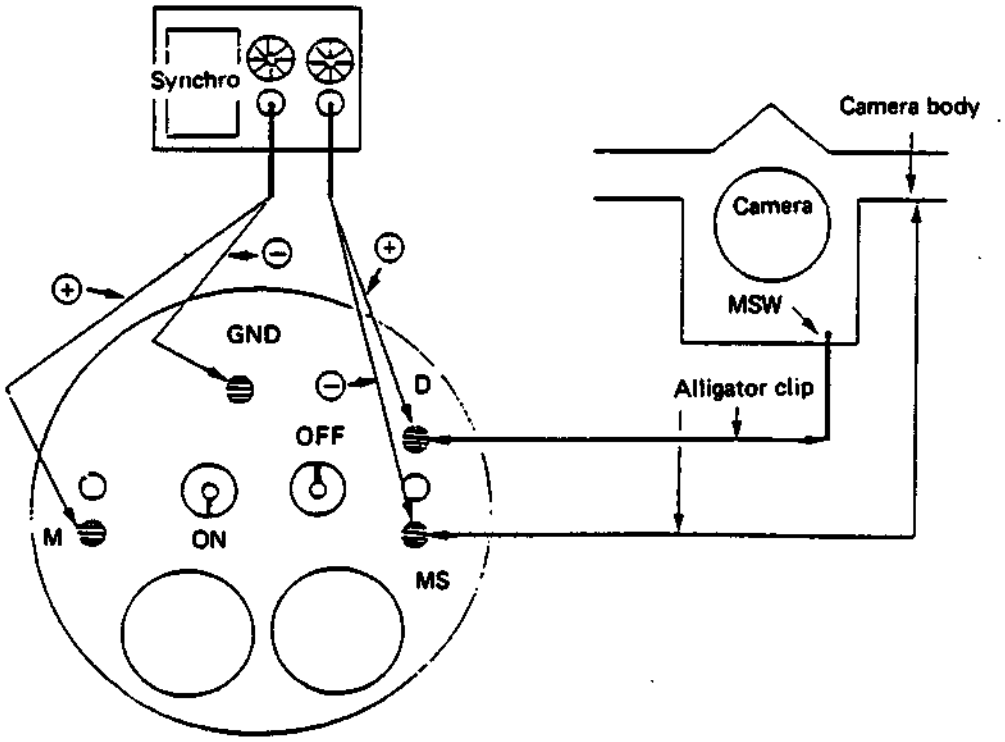
- Turn on the switch M of the MT jig.
  Probe ⊕ . . . Terminal M of the MT jig
  Probe ⊖ . . GND of the MT jig

* Set the synchroscope Trg at the M. SW.

(2) Connect the Synchro-scope to the M. SW signal input terminals as shown below:

- Turn off the switch A of the MT jig.
- Use an alligator clip to:
  Connect the camera body to the terminal MS of the MT jig, and connect the M. SW of the camera to the terminal D of the MT jig.
- Probe ⊕ . . . Terminal D of the MT jig
  Probe ⊖ . . Terminal MS of the MT jig

* Wiring diagram



B-2. Adjusting the timing to start aperture lever movement

○ The points which differ from item (A)

(1) Connect the Synchro-scope to the aperture signal input terminals as shown below:

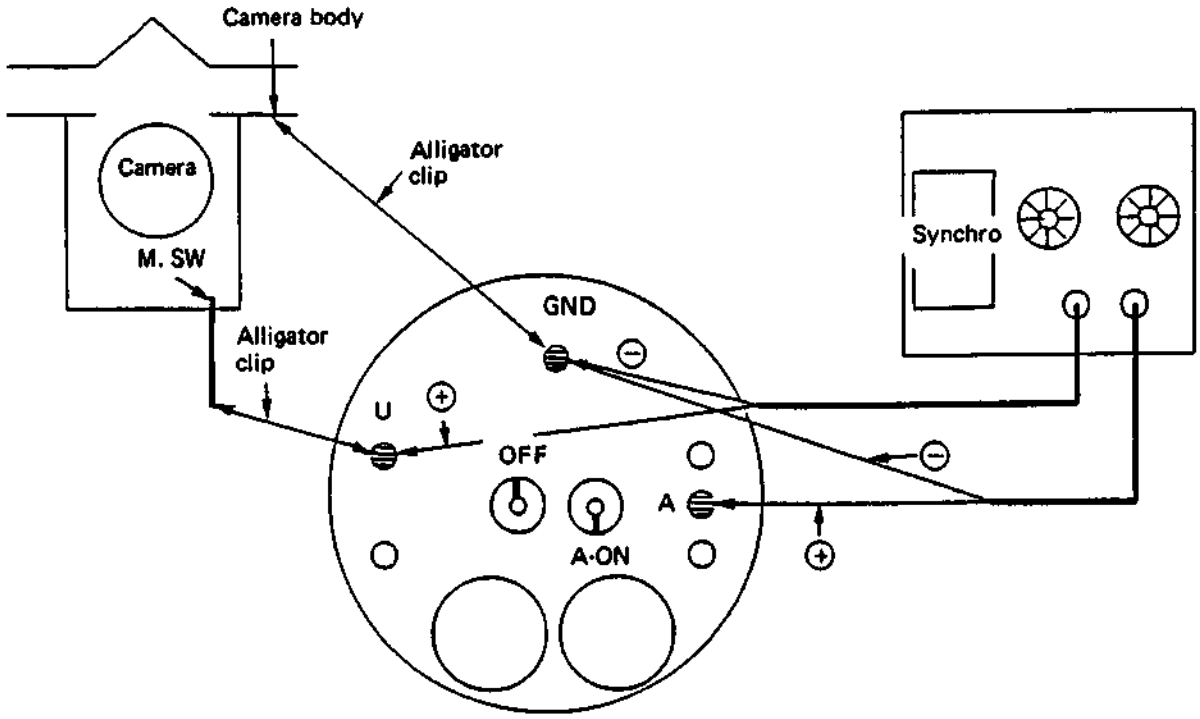
- Turn on the switch A of the MT jig.
  Probe ⊕ . . . Terminal A of the MT jig
  Probe ⊖ . . GND of the MT jig

* Set the synchroscope Trg at the M. SW.

(2) Connect the Synchro-scope to the M. SW signal input terminals as shown below:

- Turn off the switch M of the MT jig.
- Use an alligator clip to:
  Connect the M. SW of the camera to the terminal U of the MT jig, and connect the camera body to the terminal GND of the MT jig.
- Probe ⊕ . . . Terminal U of the MT jig.
  Probe ⊖ . . GND of the MT jig.

* Wiring diagram



3. Adjustment of Viewfinder Focus Point

3-1. Correction of ununiform focusing

Detach the screen and set the jig mirror in position.

Attach the front casting unit to the partial out-of-focus & focal length test collimator.

- Correction in Y direction

Correct ununiform focusing in the Y direction by slightly moving 45° P plate CE866400 of the mirror stopper.

Standard: ±5'

Difference produced by setting M charging lever:

Within 5'

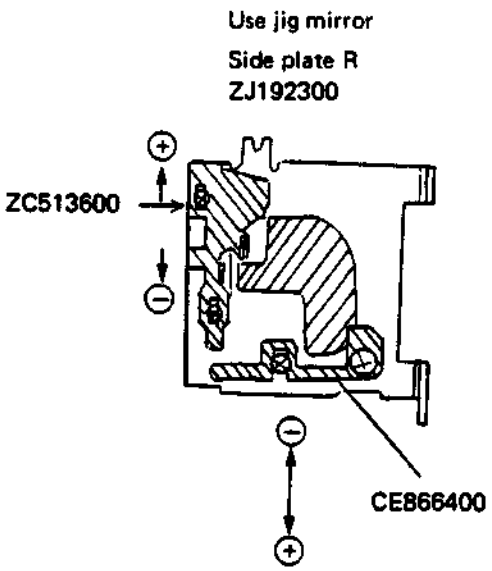
- Correction in X direction

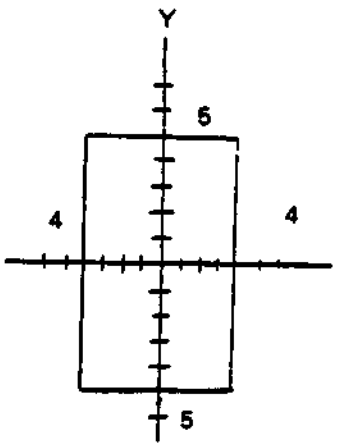
Correct ununiform focusing in the X direction by slightly moving P plate ZC513600.

Standard: ±4'

Difference produced by setting M charging lever:

Within 5'





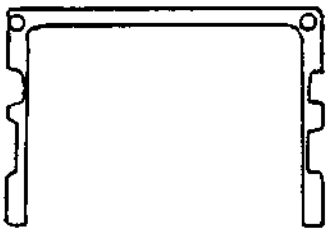
3-2. Positional adjustment of fresnel lens
(Finder focus adjustment)

Detach the focusing screen and set the jig mirror (KC 0113) in position.
Attach the front casting unit to the photo-electric collimator (FP, FC collimator f-500)

- Turn the dial scale of the collimator and read peak position (focal point) of the pointer.
- Select the spacer corresponding to the read value. (0.02 to 0.40 mm of 7 types)
- Remove the pentagonal prism and set the selected spacer.
- Set the pentagonal prism in position and read the focal point once again.

  Standard: $46.00\ ^{+0.02}_{-0.04}$ mm (with Jig mirror)

- Difference produced by resetting M charging lever: within 0.03 mm
- If the standard is not satisfied, replace the spacer with another.
- The M charging lever should be set for adjustment of the focal point.
- When the focal point is adjusted, the uniform focusing (3-1) must be confirmed once again.

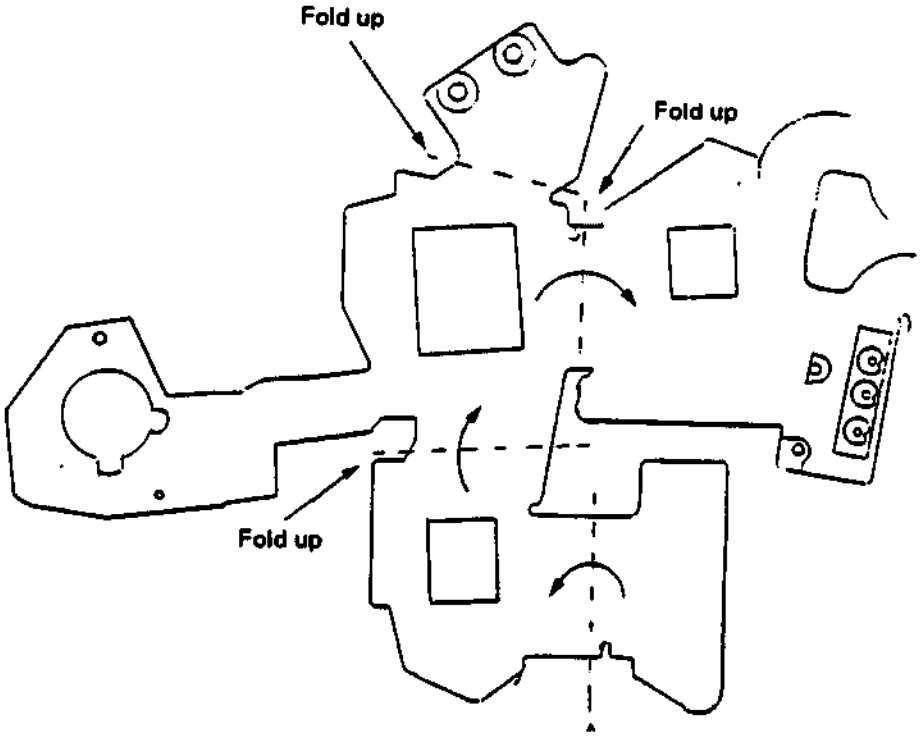


Spacer

IV. FORMING OF LEAD WIRES AND CIRCUIT BOARDS

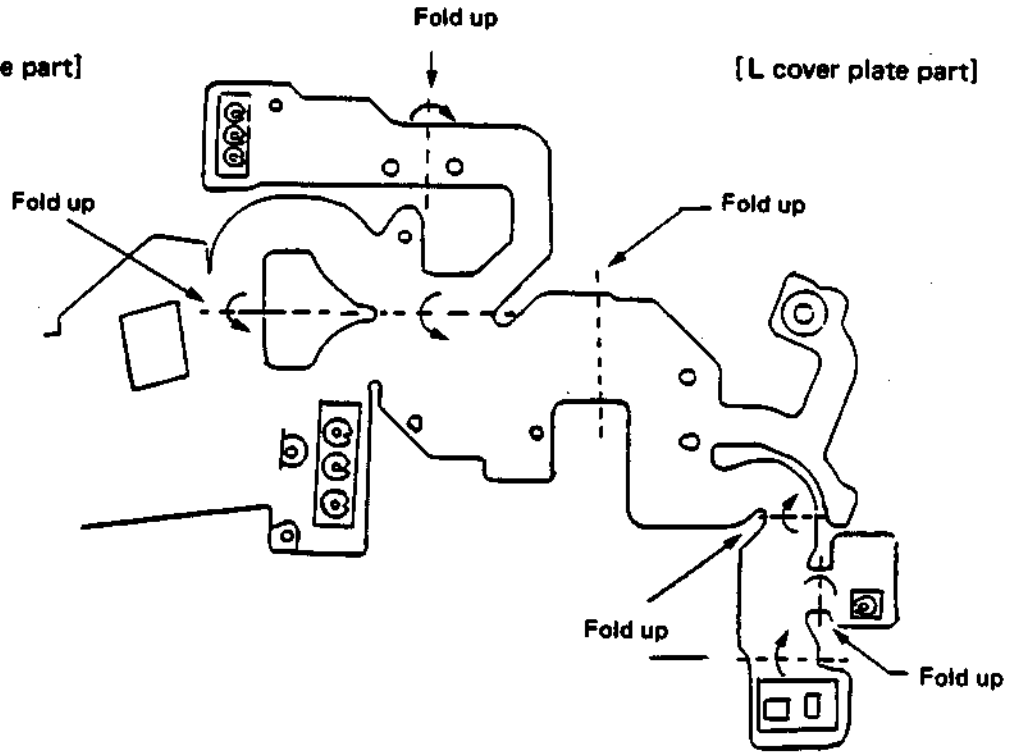
1. Forming of M5 Circuit Board

[Penta-prism part]



[Side plate part]

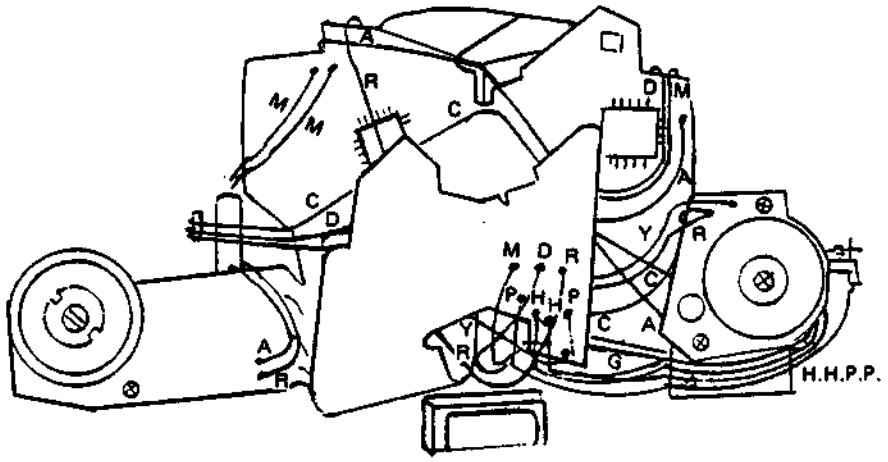
[L cover plate part]



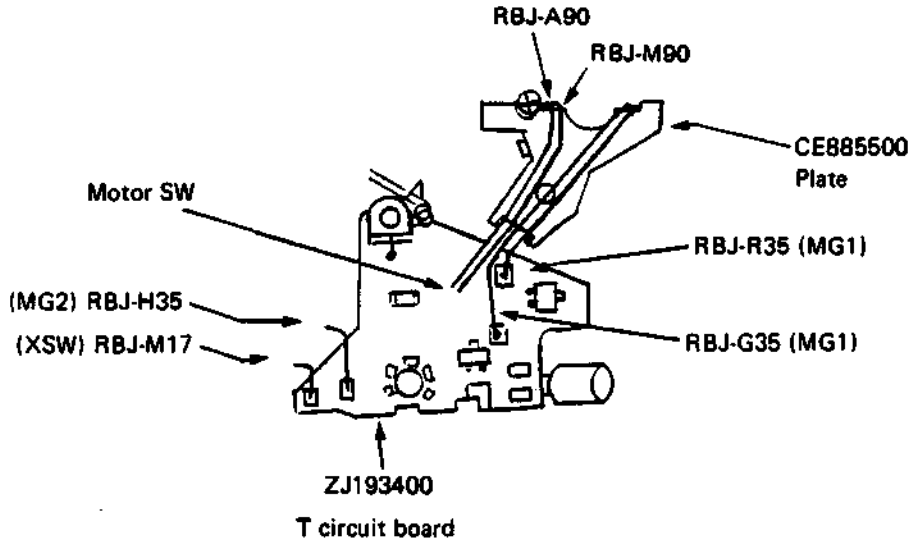
2. Forming of Lead Wires

2-1. Forming of lead wires

- Lead wires must not be overlapped.



2-2. Forming lead wires of T circuit board



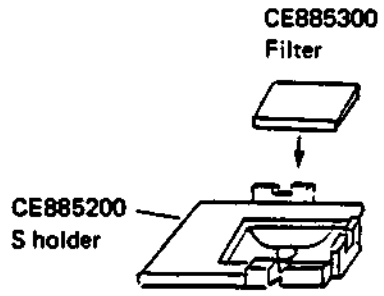
V. Reassembly of M5 circuit board

1. Form the M5 circuit board (ZC495700)

2. Reassembly of photosensor

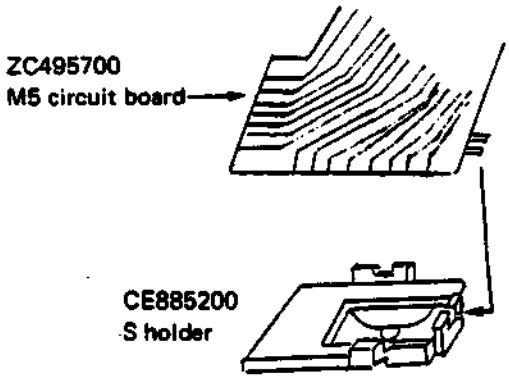
2-1. Reassembly of S holder

- Mount the filter (CE885300) on the S holder (CE885200)



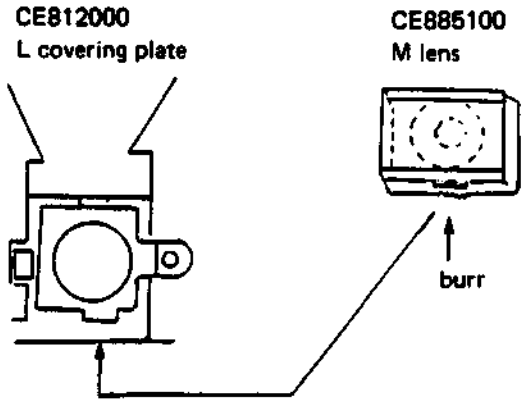
- Apply pliobond on the S holder.

- Bond the head amplifier of M5 circuit board on the S holder.



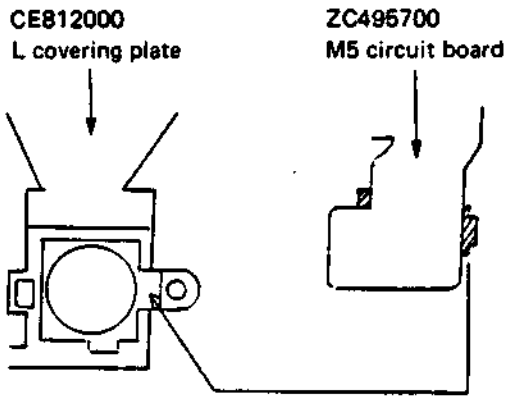
2-2. Push M lens (CE885100) into L covering plate (CE812000).

- The M lens should be set in such a direction that the lens is located on the side of the front surface of the L covering plate.

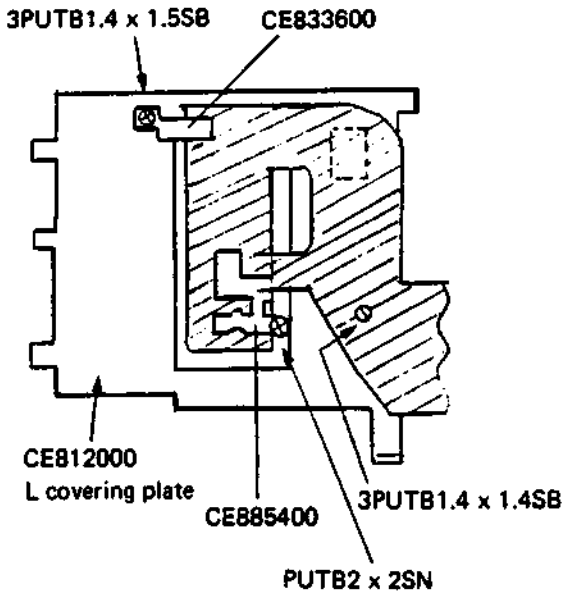


2-3. Reassembly of M5 circuit board

- Fit M5 circuit board (ZC495700) in alignment with the groove of the L covering plate as shown on the right side.

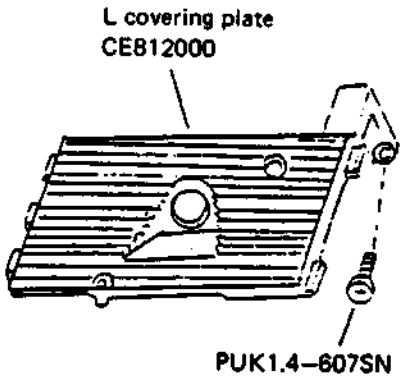


- Bring the L holder (CE885400) into contact with the M5 circuit board and fix it by tightening screw PUTB2 x 2DN.
- Bring the FPC holder (CE833600) into contact with the M5 circuit board and fix it by tightening screw 3PUTB 1.4 x 1.5SB.
- Fix the M5 circuit board by tightening screw 3PUTB 1.4 x 1.4SB.



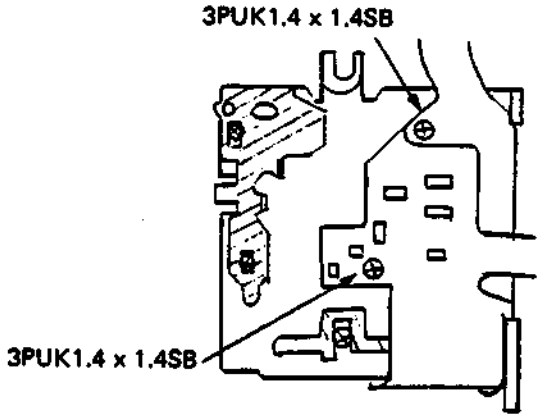
3. Attach L covering plate CE812000 to the front casting unit.

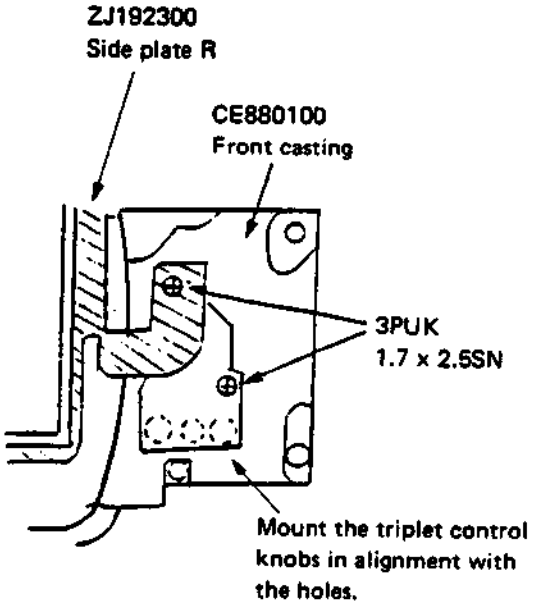
- ○ The projections of the L covering plate must be fitted into the grooves of the side plate L and R without fail.
- ○ The L covering plate must be free from deformation.
- · Upward deformation of the L covering plate will eclipse the rays, resulting in vignetting of image.
- · Downward deformation of the L covering plate will prevent the correct ESP metering.
- ○ Fix the L covering plate to the front casting unit with Screws PUK1.4–607SN.



4. Reassembly of side plate part.

- ○ Fit the M5 circuit board ZC495700 to the side plate R ZJ192300 and fix with screws 3PUK 1.4 x 1.4SB.



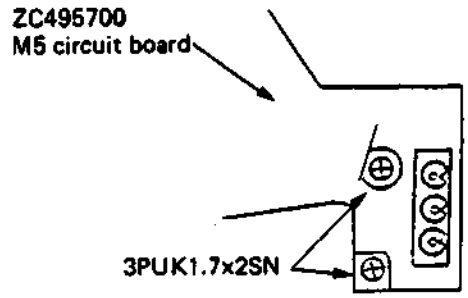


- ○ Fit the M5 circuit board ZC495700 to the front plate CE880100 and fix with screws 3PUK1.7 x 2.5 SN.

- ○ Control knobs of the variable resistor must not be deformed.

5. Reassembly of penta-prism part.

   ○ Fit the M5 circuit board ZC495700 to front plate CE880100 and fix it by tightening the screws 3PUK1.7 x 2SN.



6. Reassembly of L5 circuit board.

   (1) Clean the connector part of both M5 and L5 circuit boards by using mixture (ether and alcohol).

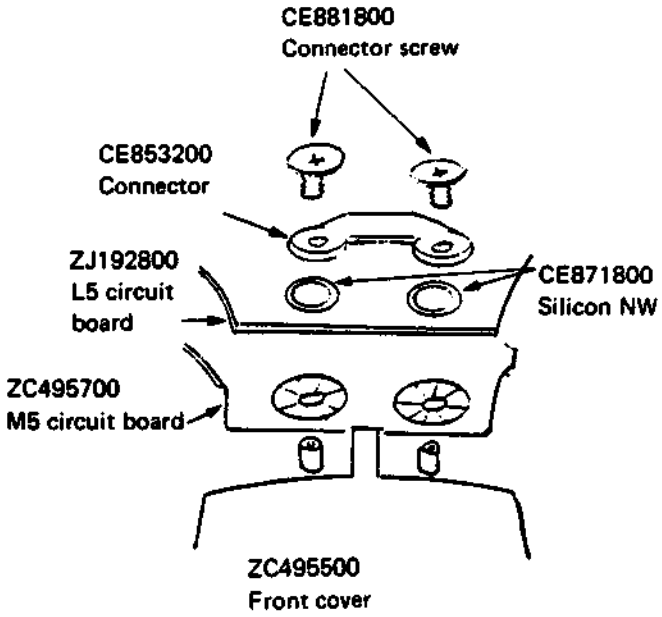
   (2) Mount the M5 and L5 circuit boards on the front cover in alignment with both holes and projections.

   (3) Set the silicon washers CE871800 on the L5 circuit board.

   (4) Set the connector CE853200 on the silicon washer and fix it by tightening the connector screws CE881800.

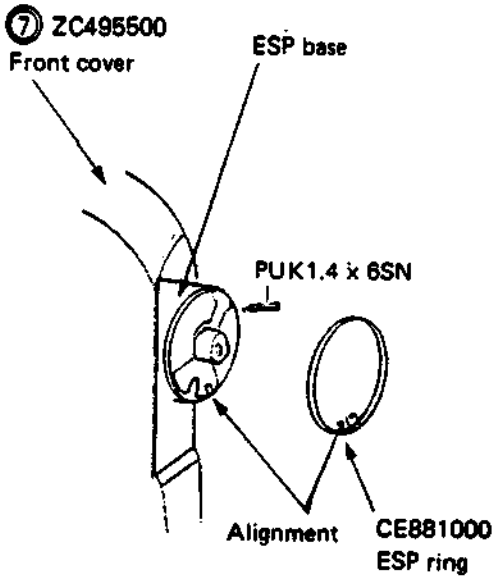
   ○ The circuit boards must not be twisted.

7. Solder the leadwires.



VI. REASSEMBLY OF FRONT COVER.

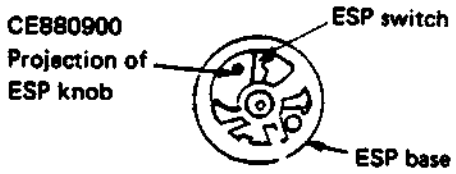
1. Set the ESP base on the front cover and mount the front cover to front plate.



2. Fix the ESP base with screw PUK1.4 x 6SN.

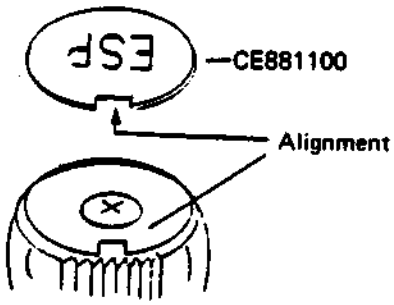
3. Set the ESP ring CE881000 on the ESP base.
   - The projection of ESP ring must be fitted into the groove of ESP base.

4. Set the ESP knob CE880900.
   - Insert the projection of ESP knob in position of the left side of ESP switch.



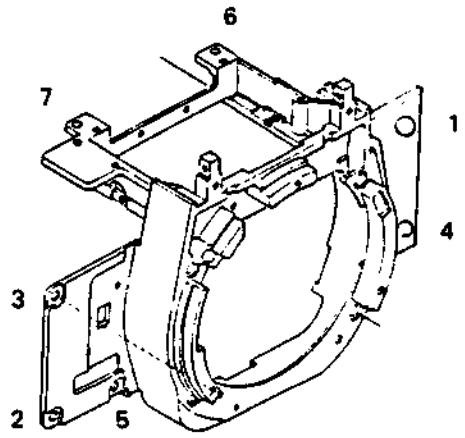
5. Set the B2, ESP collar CE881300 and ESP click CE881200 on the ESP knob and fix them by tightening the screw PUTB1.4–610SN.
   - The ESP knob must be turned smoothly.

6. Stick the ESP seal on the ESP knob.

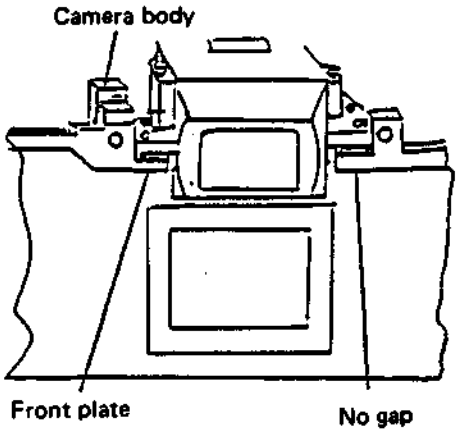


VII. REASSEMBLY OF FRONT PLATE.

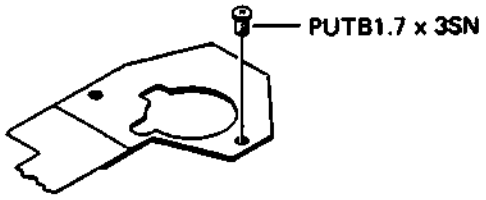
1. Set the front plate into the camera body.
   - o Charge the shutter.



- o Keep the KM lever ZC452800 in stationary condition.
- o Take care not to catch each lead wire or FPC.
- o Take care to properly position M lever CE503800 and M charging lever ZC509600.
- o The camera body and front plate must be free from rattling.
- o Take care not to stick out each light-proof padding.
- o While holding the front plate at the lower right side from the front side, fix it with screws CA915500.
- o Fix the front plate to the camera body by tightening screws CA915500 (5) and PUK1.7–516SN.
- o No vertical gap should remain between front plate and camera body as shown right side.
  Use the spacer when the gap is wider than 0.2 mm.
  When the spacer is already used, do not place another spacer.



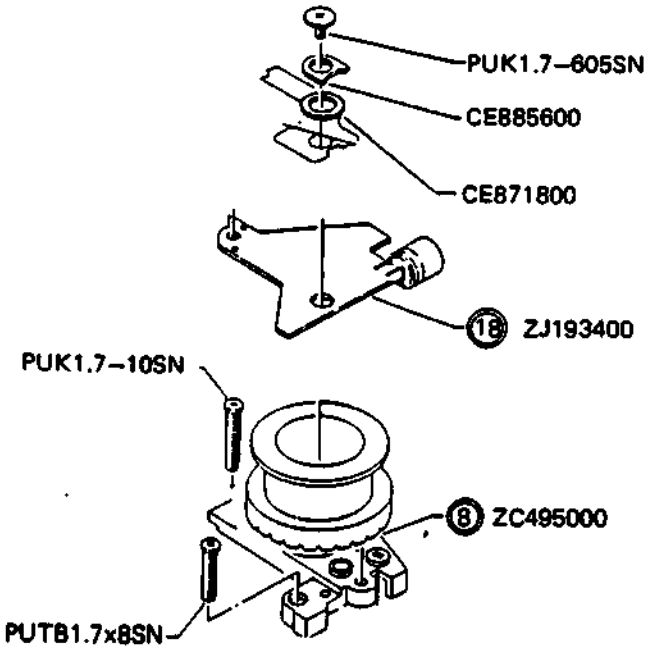
2. Fix the M5 circuit board to the R shaft holder by tightening two PUTB1.7 x 3SN screws.



3. Tighten the T circuit board ZJ193400 and M5 circuit board ZC495700 with silicone NW CE871800, T washer CE885600, and PUK1.7–605SN.

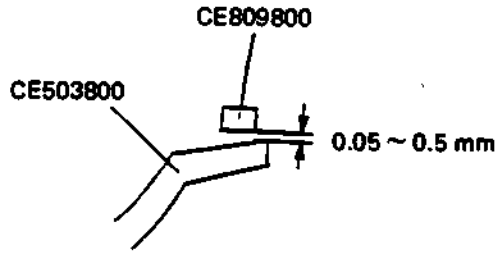
4. Tighten the A baseplate ZC495000 with PUK1.7x10SN and PUTB1.7x8SN.

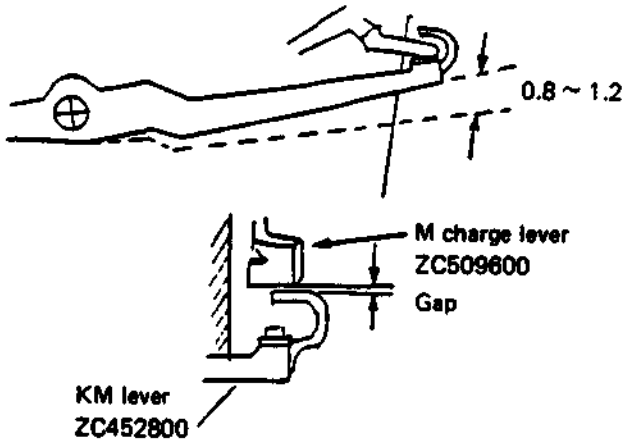
5. Solder each lead wire in position.



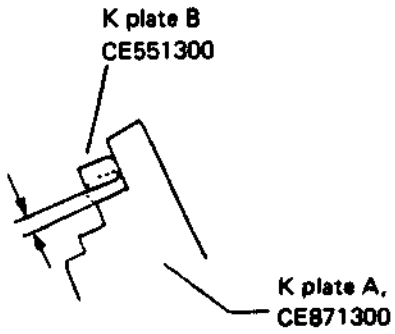
6. Checks and confirmations after fixing the front plate.

- Gap between the front plate and camera body frame;
  Back-forth: 0.3 mm max.
  Vertical: 0.2 mm max.
- Gap between M lever CE503800 and D hook CE809800:
  0.05 to 0.5 mm with the shutter released and mirror set at the DOWN position
  Vertical engagement:
  At least equal to the thickness of the plate
- M charging lever ZC509600 must be engaged with KM lever ZC452800 in sufficient depth.
- Overcharging of the M charging lever:
  0.8 to 1.2 mm
- Before film winding, a gap must be reserved between M charging lever ZC509600 and KM lever ZC452800.

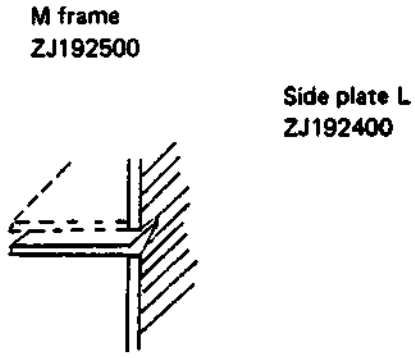




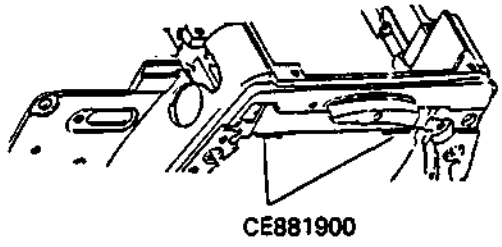
○ Overcharging of K plate B CE551300
At least 0.2 mm with no overriding of K plate A.



○ Shutter-releasing position
The shutter should be released while the lower end of the M frame is located within the range of the groove formed in the side plate L.
(Check in manual B mode.)



○ Stop position of mirror at its ascending time
The mirror should be stopped when M frame ZJ192500 is brought into contact with M cushion CE881900.



VIII. ADJUSTMENT OF M5 CIRCUIT BOARD

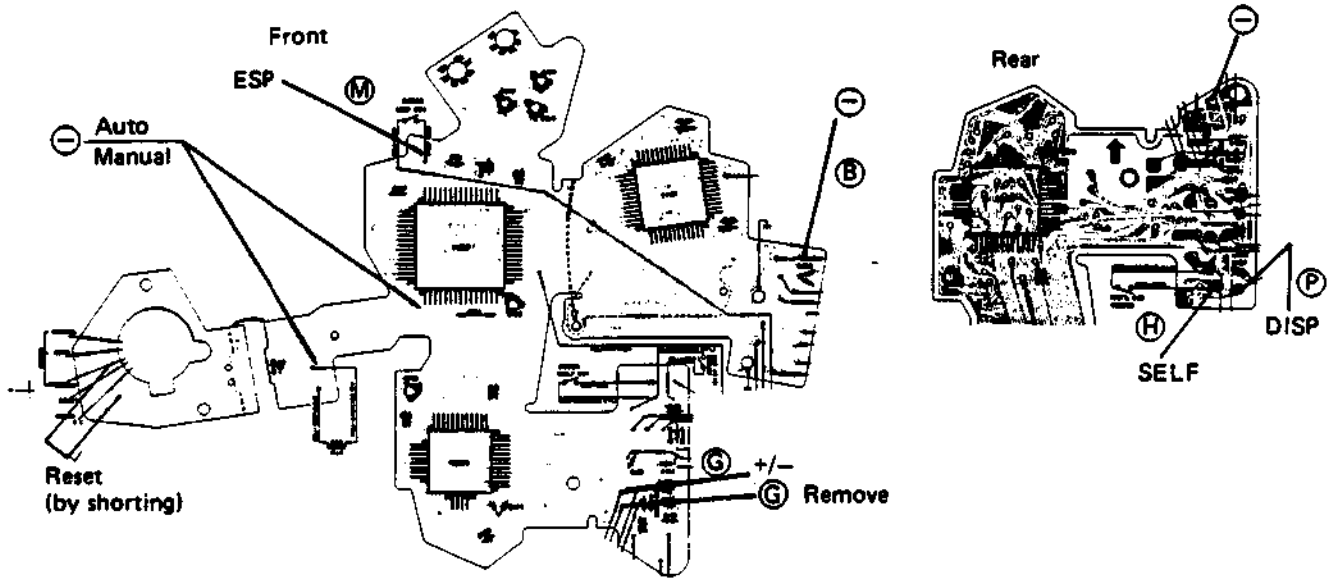
- Adjust the M5 circuit board whenever it is replaced with a new one or is repaired.
- Be sure to take the adjusting procedures from 1 to 5, and follow the procedures 6, 7 or 8 as required.
- Preparation for adjustment.

1. Jigs to be used
   (1) Digital voltmeter (or tester)
   (2) A few lead wires
   (3) VR adjusting wrench
   (4) Stabilizer

2. Preparatory works:
   (1) Detach the top cover.
   (2) Disconnect the green lead wire (RBJ-G30, Vref) from ST circuit board.
   (3) Connect a lead wire to the negative terminal of the M5 circuit board.
   (4) Connect lead wires to the following terminals:
   DISP (IC103 terminal 40)
   +/– (IC103 terminal 41)
   Disconnect either of the green lead wire.
   SELF (IC103 terminal 42)
   ESP (IC103 terminal 43)
   (5) Set the stabilizer to 3.0 ± 0.05V and supply power to the M5 circuit board.

3. Start of test program
   - Manual (IC103 terminal 30)
   - Auto (IC103 terminal 31)

   Short-circuit the above two terminals to the negative terminal for resetting.



1. Adjustment of Lock Voltage (Vref adjustment)

○ Standard value:

1780 ± 10 mV between Vref and (–)
Locking voltage: $2.6^{+0.05}_{-0}$ V

○ Measuring methods

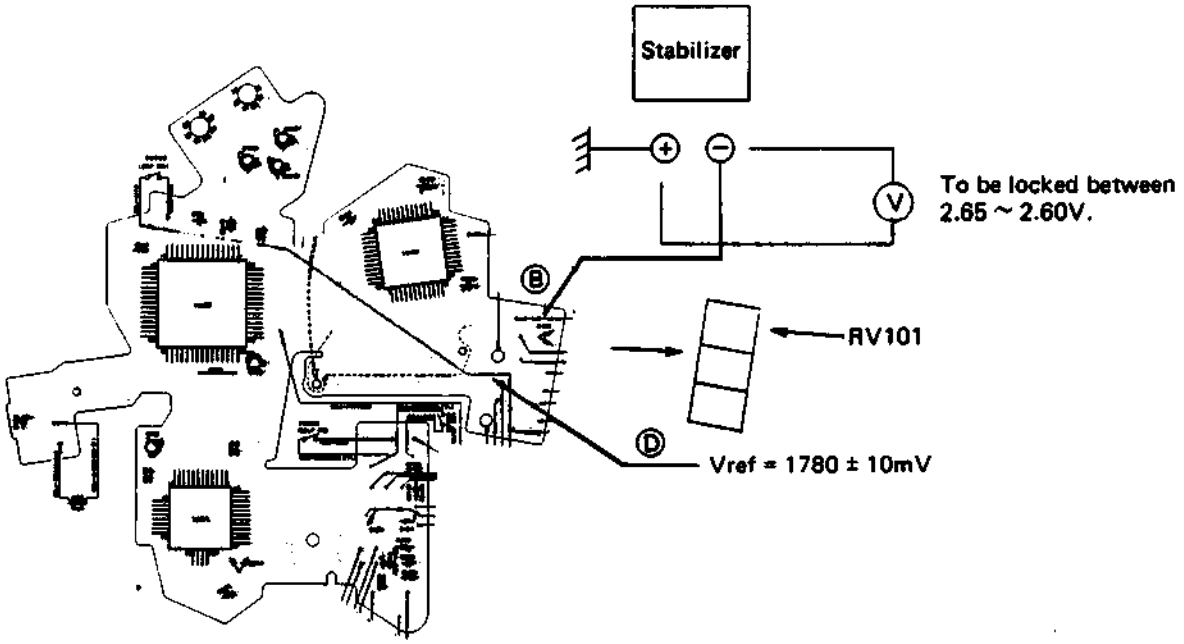
(1) ISO100
(2) Power voltage 3.0 ~ 2.6V
(3) DISP → H
+/– → H
SELF → L
ESP → L
} The settings are established correctly if B.C. mode is selected.
(4) Start the test program.
(5) Measure voltage between Vref and the negative terminal (–).
Check the shutter lock voltage while lowering the stabilizer voltage.

○ Otherwise, check the voltage at which the B.C. LED goes off while lowering the voltage after lighting on the LED in the B.C. mode.

○ If the Vref is correctly adjusted to 1780mV, the locking voltage is automatically adjusted.
The Vref can be adjusted in any mode.

○ Adjusting method

The shutter should be locked at the voltage between 2.65 and 2.60V, when lowering the voltage of the M5 circuit board source. At this point, Vref should be 1780 ± 10mV. Use the RV101 for adjustment.



2. Adjustment of Standard Current (Iref adjustment)

○ Standard value

Temperature	14°C	16°C	18°C	20°C	22°C	24°C	26°C	28°C	
Iref	125.8	126.7	127.6	128.5	129.4	130.2	131.1	131.9	mV
								(±0.2mV)	

○ Measuring method

(1) ISO3200

(2) DISP → H
+/− → L
SELF → L
ESP → L
} The settings are established correctly if B.C. mode is selected.

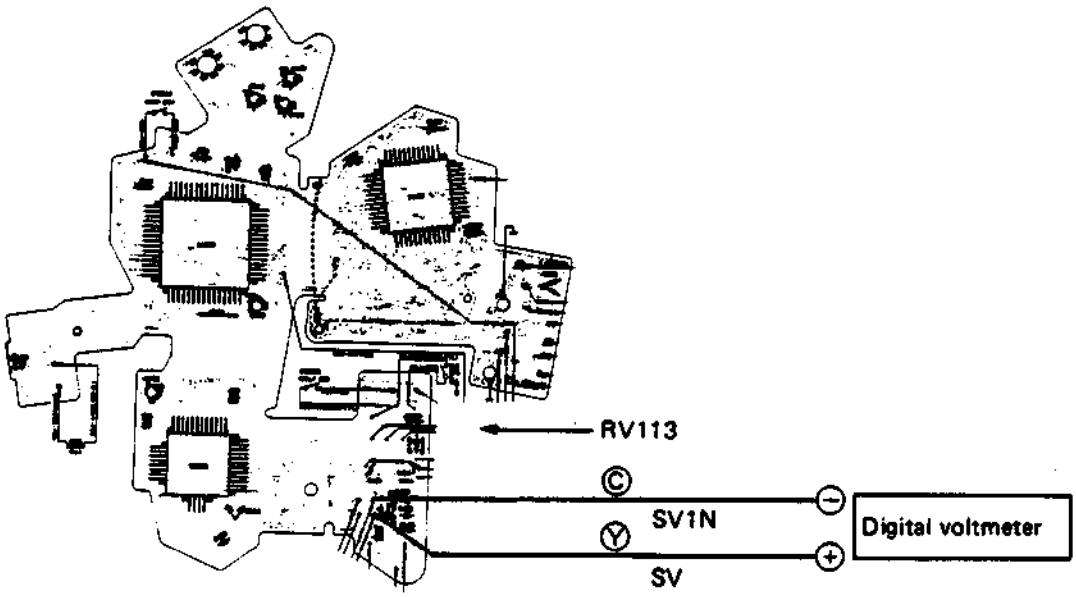
(3) Start the test program.

(4) Measure voltage between SV1N and SV.

○ B.C. mode is acceptable.

○ Adjusting method

Use the RV113 for adjustment.



3. AV/TV Adjustment

○ Standard value

Temperature	14°C	16°C	18°C	20°C	22°C	24°C	26°C	28°C
TV/AV	197.3	198.7	200.1	201.5	202.9	204.2	205.6	207.0

mV

(±0.2mV)

○ Measuring method

(1) ISO100

(2) DISP → H
+/− → L
SELF → L
ESP → L
} The settings are established correctly if B.C. mode is selected.

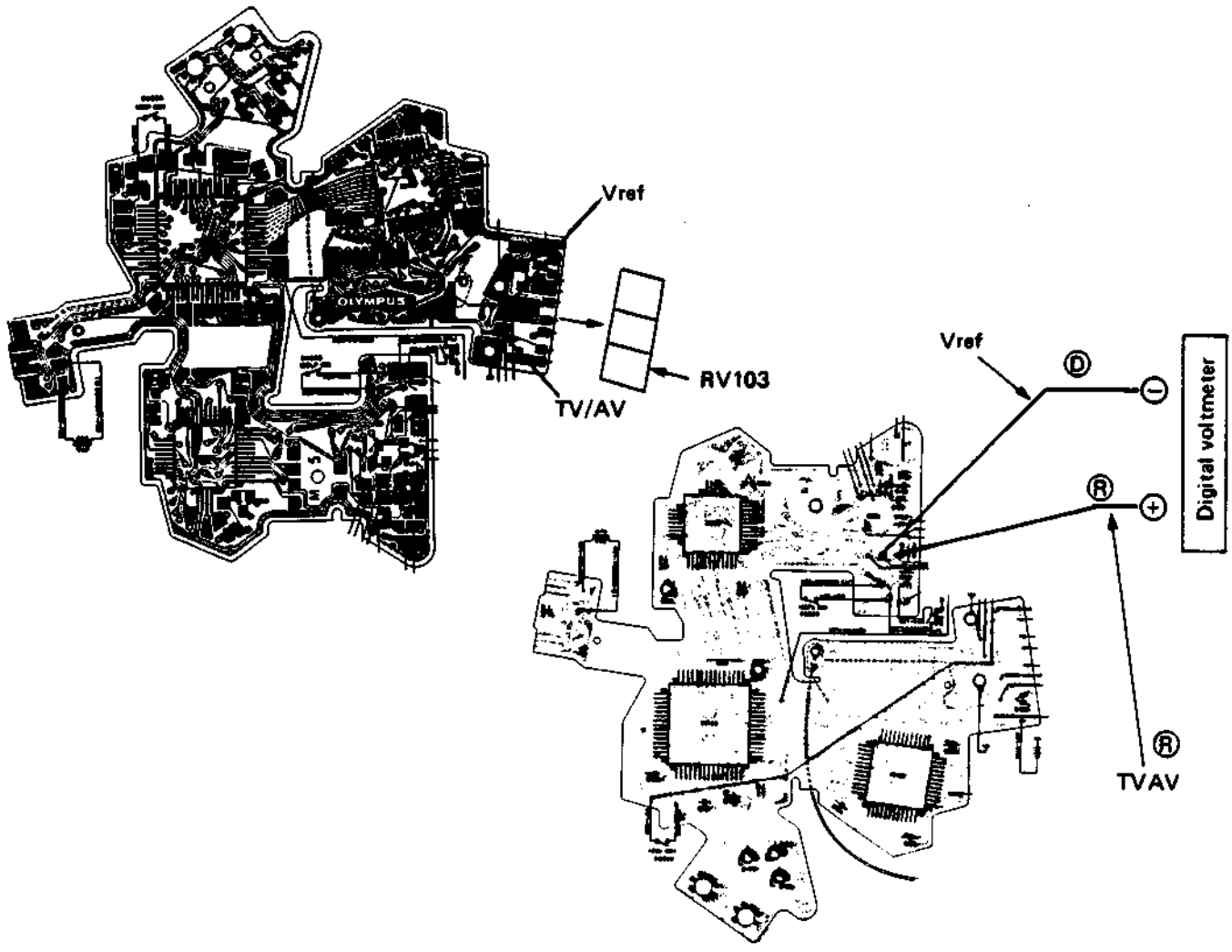
(3) Start the test program.

(4) Measure voltage between Vref — TV/AV out.

○ B.C. mode is acceptable.

○ Adjusting method

Use the RV103 for adjustment.



4. DAC Adjustment

○ Standard value

Temperature	14°C	16°C	18°C	20°C	22°C	24°C	26°C	28°C
DAC	188.8	190.1	191.4	192.7	194.0	195.4	196.7	198.0

mV

(±0.2mV)

○ Measuring method

(1) ISO100

(2) DISP → L

+/– → H

SELF → L

ESP → L

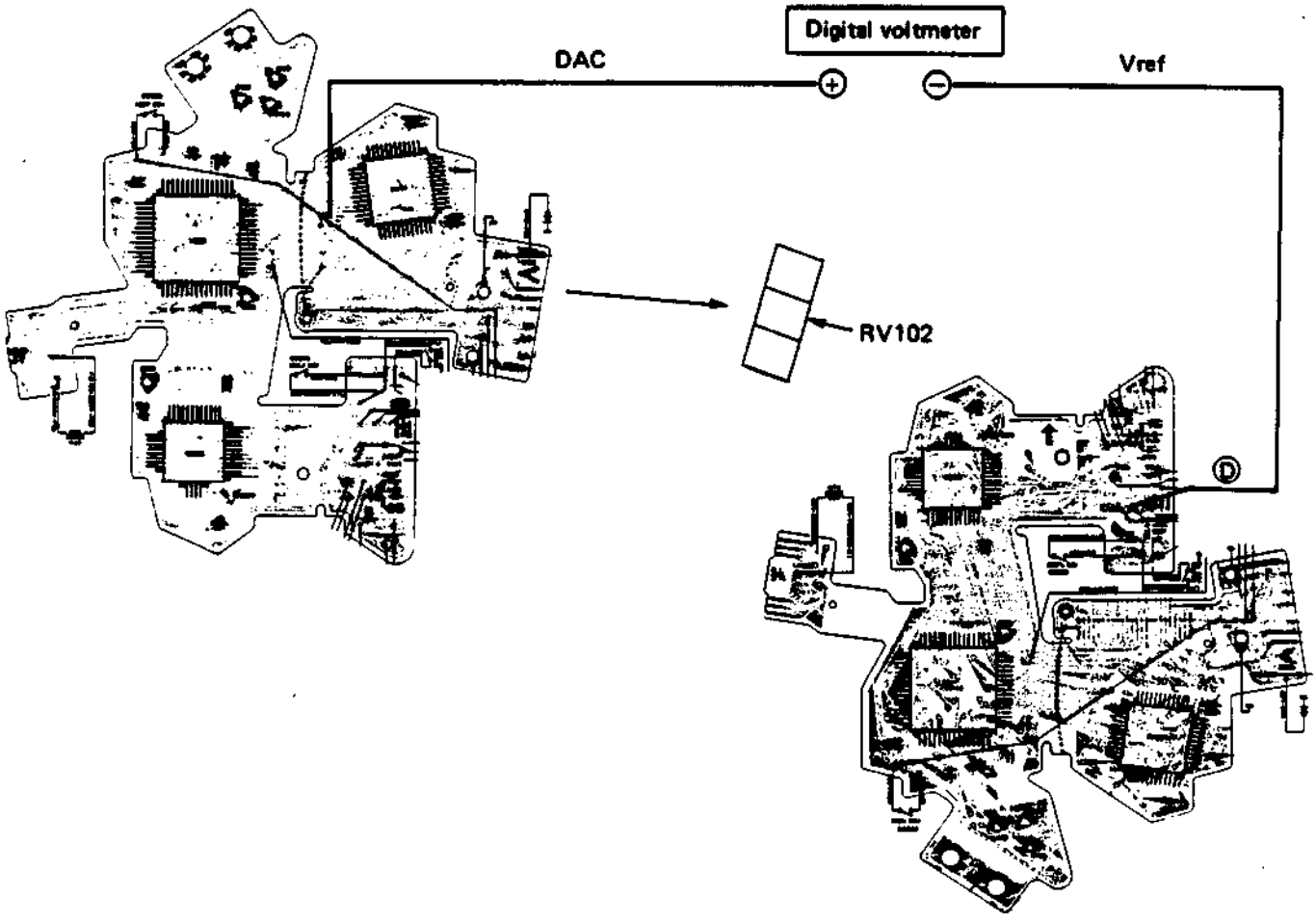
(3) Start the test program.

(4) Measure voltage between Vref and DAC out.

○ Be sure to measure it in the test mode.

○ Adjusting method

Use the RV102 for adjustment.



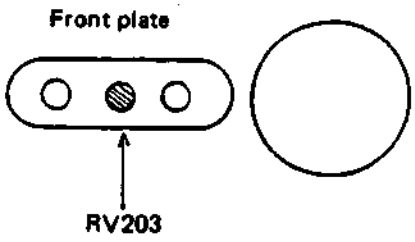
5. ESP Adjustment

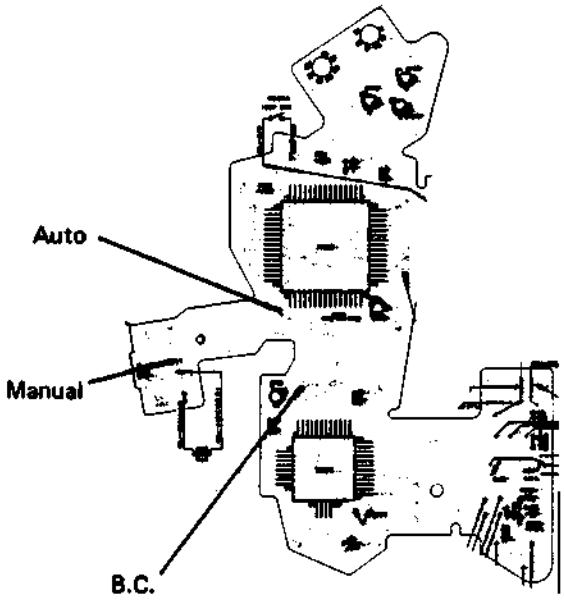
5-1. Adjusting the B pattern (average) display

- Standard value
  Approx. 180.0mV

- Measuring method
  (1) Disconnect the green lead wire (RBJ-G30 Vref) (ST circuit board).
  (2) Turn off the ESP switch.
  (3) ISO = 100 (set free)
  (4) BV13
  (5) F5.6 (MS5018 fully opened)
  (6) B.C. → L
  Manual → L
  Auto → L
  (7) Start resetting (then, the test program is started).
  (8) Measure voltage between Vref and BV3.
  - Should no BV13 range be available, use the ND filter for adjustment.

- Adjusting method
  Use the RV203 for adjustment.



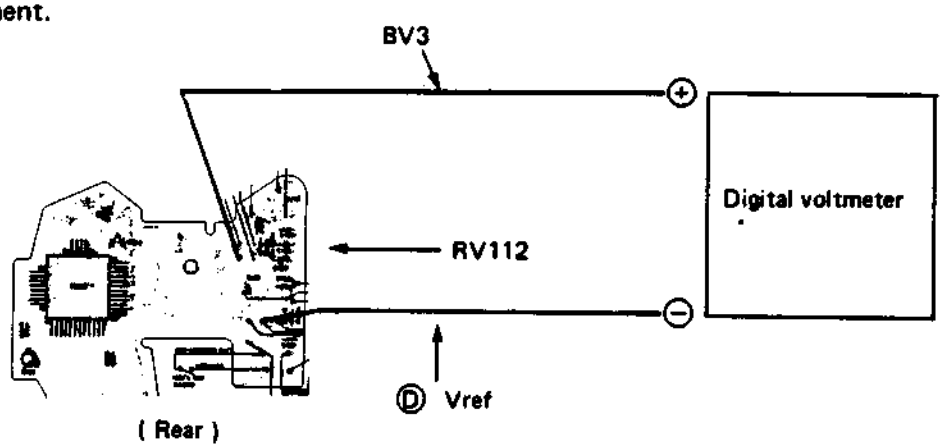


5-2. Adjusting the A pattern (central portion) display

- Standard value
  Within ±1mV against B pattern

- Measuring method
  (1) Set in the same conditions as item 5-1 above.
  (2) Turn on the ESP switch.
  (3) Measure voltage between Vref and BV3.

- Adjusting method
  Use RV112 for adjustment.

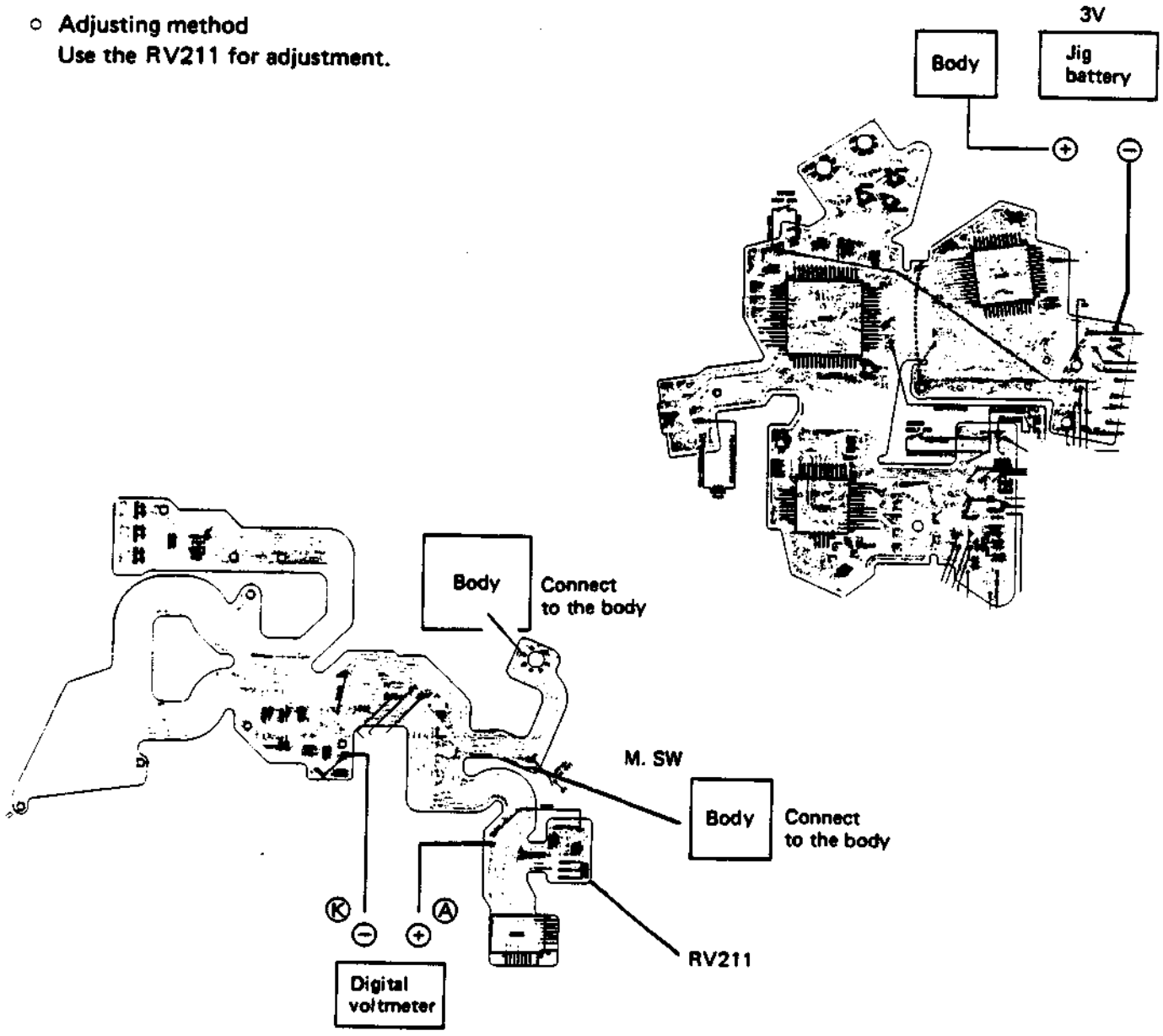


6. Adjustment of Head Amplifier Offset

- Standard value
  1mV or less

- Measuring method
  (1) ISO100
  (2) Fully darken the photosensor unit.
  (3) Turn on the M. SW
  (4) Turn on the Trg. SW
  (5) DISP → H
  +/– → H
  SELF → L
  ESP → L
  (6) Start the test program.
  (7) Measure voltage between anode and cathode.
  *Remove the front plate. Supply power.

- Adjusting method
  Use the RV211 for adjustment.

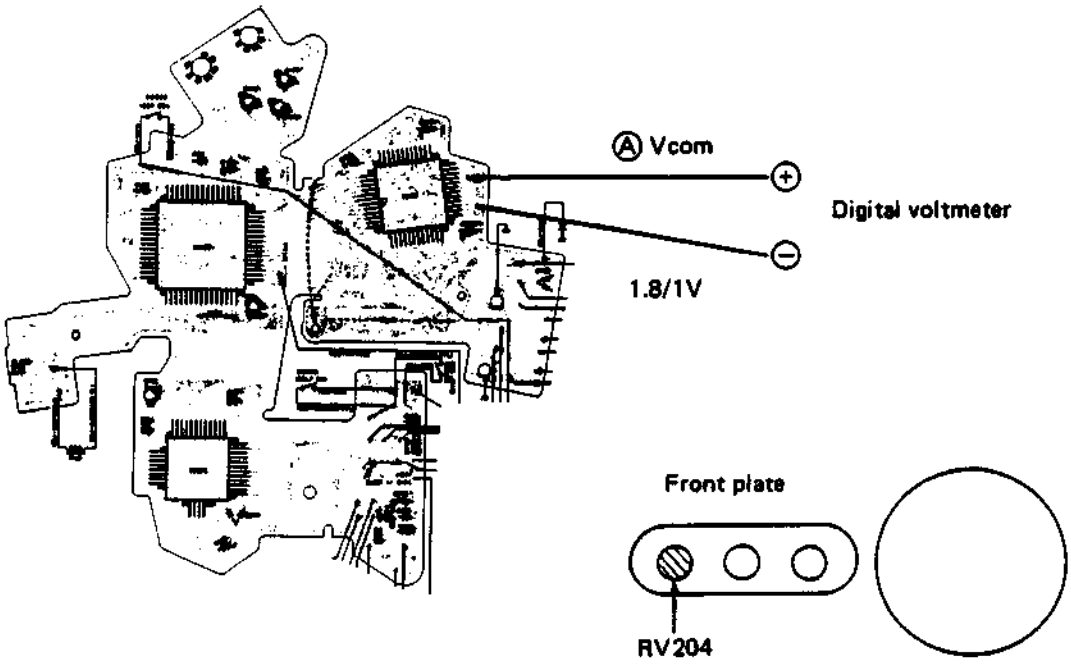


7. Tentative Adjustment of Vcom

- Standard value
  200mV for ISO100
  50 ~ 60mV for ISO400

- Measuring method
  (1) ISO100
  (2) Turn on the M. SW ┐ Establish mirror-up
  (3) Turn on the Trg. SW ┘ state.
  (4) DISP → L
  +/– → L
  SELF → H
  ESP → L
  (5) Start the test program.
  (6) Measure voltage between 1.8/1V and Vcom.

- Adjusting method
  Use th RV204 (EE adj) for adjustment.



8. **Check of View Finder LED's (whether or not they come on one after another)**

- Standard
  The LED's should come on one after another. (From P to +–)

- Measuring method
  (1) DISP → L
  +/– → L
  SELF → L
  ESP → L
  (2) Start the test program.
  (3) Confirm that the LED's have come on in the view finder.

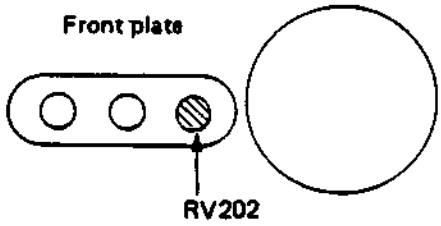
- No adjustment is effected.

IX. ADJUSTMENT OF EXPOSURE AND DISPLAY CIRCUIT

1. TV Adjustment (manual time)

○ Standard value: Check the following points
(1) Manual shutter speed 1/1000
. . . . 0.95 ~ 1.05 mS
(2) Each shutter speed must be within the standard.
(3) Unevenness in exposure: A and C channel should be within ±0.2 mS against B channel at 1/1000.
(4) Deviation from reference value:
0.3 mS or less

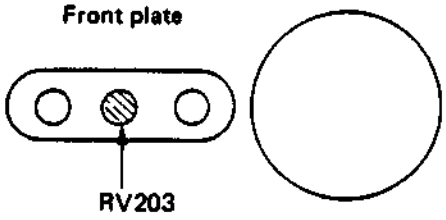
○ Measuring method
(1) Select the manual mode.
(2) Adjust curtain speed in advance.
1. 10.5 ± 0.1 mS at 1/1000
2. Difference between 1st and 2nd curtain speed:
0.08 mS or less
(3) Confirm the shutter speed by releasing the shutter 10 times or more (at 1/1000).



○ Adjusting method
Use the RV202 for adjustment.

2. Adjustment of Indication (BV)

○ Standard value
(1) Display should indicate 1/60 at BV12, ISO125 and F8.
(2) The display should not be changed even if the SV (ISO) is changed by 1/3 step.
(3) The following check points should fall within the standard value (at ISO125).
BV8 F5.6 1/8
BV14 F5.6 1/500
(4) Check the same by changing the ISO value. At ISO H00, BV12, F8 . . . 1/250S should be lit



○ Measuring method
(1) Select the auto mode.
(2) Set ISO125
(3) BV12
(4) F8

The 1/60 should come on under the above-mentioned conditions.

○ Adjusting method
Use the RV203 for adjustment.

3. Aperture Preferred EE Adjustment

○ Standard value

(1) ±0.1 EV at BV12, ISO100, and F5.6
(2) Respective checking points should fall within the standard values.
(3) Check of ISO conversion:

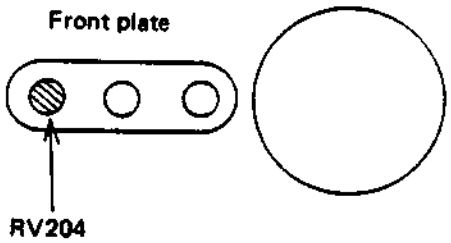
ISO	25	400	3200
ISO accuracy	±0.35	±0.35	+0.4~+1.65

○ Measuring point

(1) Select the auto mode.
(2) ISO100
(3) BV12
(4) F5.6

○ Adjusting method

Use the RV204 for the adjustment.



4. Adjustment of DX Accuracy

○ Standard value

(1) 0 ± 0.2 EV at BV8, ISO100, and F5.6
(2) Respective checking points should fall within the standard values.
(3) Check by changing DX ISO

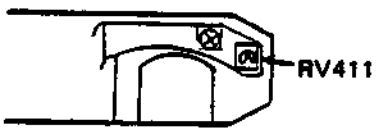
ISO	25	400	1600	3200
ISO accuracy	±0.35	±0.35	±1.0	+0.4~+1.65

○ Measuring method

(1) Select the auto mode.
(2) ISO100
(3) BV8
(4) F5.6

○ Adjusting method

Use the RV411 (provided on the bottom side as D5 flexible VR).



Bottom of the body

5. Check of Programmed EE

○ Adjust the program EE under the auto EE adjustment.

5-1. Checking the EE

○ Adjust the EE in the aperture preferred auto mode.

○ EE values should be within the standard range of aperture preferred auto EE.

5-2. Adjusting aperture control

○ Standard value:

BV	8	12	15
F	Open	4.5	8
Reference value	$0^{+0.8}_{-1.0}$	$0^{+0.8}_{-1.0}$	$0^{+0.7}_{-1.2}$

○ Measuring method

(1) Select the program mode

(2) ISO: 100

(3) F stop: 16

(4) Focus: ∞

(5) Light box: BV8, 12, 15

(6) Set the self-timer after winding.

- Direct the camera lens to the light box and release the shutter.
- Divert the camera lens from the light box within 12 seconds and check the lens aperture.
- At this time, the lens aperture should be within the standard range.

○ Adjusting method

Remove the front plate to readjust the side plate L ZJ192400 (by referring to page D-21).

5-3. Inspection of the flash program

○ Standard value

BV4 Between full-open position and F5.6, but it must be on the side of full-open position from BV8.

BV8 Between full-open position and F5.6.

○ Measuring method

(1) Select the program mode.

(2) ISO: 100

(3) F stop: 16

(4) Light box: BV4 and BV8

(5) Mount a T-series flash unit onto the camera and turn the switch on to select the flash mode.

- Set the camera to the self-timer mode, direct it to the light box, and release the shutter.
- Divert the camera lens from the light box within 12 seconds and check the lens aperture.
- At this time, the lens aperture should be within the standard range.

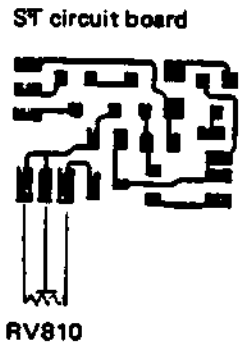
*No adjustment is available; only inspection should.

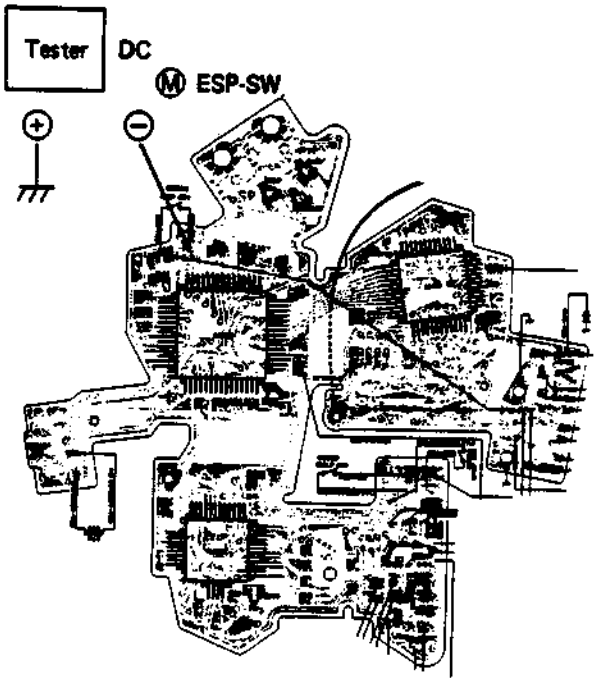
6. Adjustment of ESP. BV

- Standard value
  Approx. 100mV or less at BV7
  Approx. 1V or more at BV9

- Measuring method
  (1) Either mode is applicable (auto, program, or manual).
  (2) Display: ON
  (3) ISO: 100
  (4) F16 (MS5018)
  (5) ESP switch: ON
  (6) Measure voltage between the body (+) and the CPU IC terminal No. 43 by using an analog tester:
  A: Approx. 1V or more at BV9
  B: Approx. 100mV or less at BV7 (if no BV7 range is available, use the ND filter for adjustment.)

- Adjusting method
  Use the RV810 of the ST circuit board.

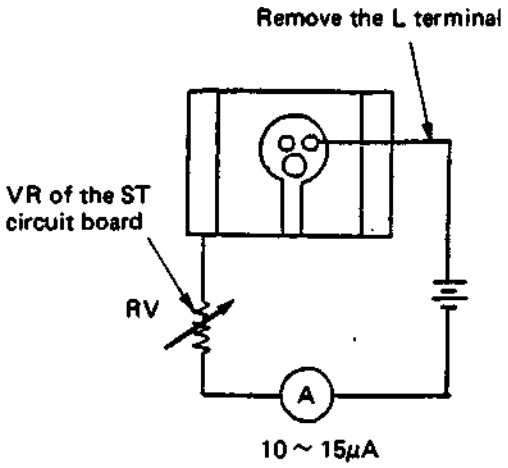




X. CHECK OF FLASH INDICATOR LED IN VIEW FINDER

7-1. Check of flash time switching

- For a circuit as shown on the right side. Adjust the current by turning the variable resistor.
- When supplying 10 ~ 15μA, auto flash time of 1/60 should be selected.
  - Mount the body cap while selecting the auto mode, connect as shown in the right drawing, and release the shutter. Then, disconnect the lead wire from the L terminal.
    (1) If the shutter is released at 1/30 to 1/60 when disconnecting the lead wire, the switching operation should be judged to be normal.
    (2) If the shutter is not released immediately after disconnecting it, this means that no flash mode has been selected.

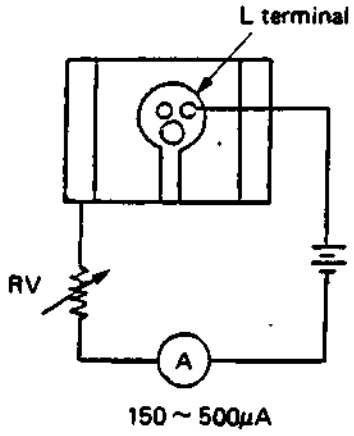


7-2. Check of flash charge indicator lamp

- Prepare a circuit as shown on the right side. The " ϟ " mark indication LED must be lit in the viewfinder at 150 to 500μA.

7-3. Check of correct flash exposure flicker circuit

- Mount the T-series flash in position and flash it within the correct range.
- When the auto-check lamp of flash unit blinks, the LED must flicker in the view finder.



E

REPAIRING PROCEDURES

E. REPAIRING PROCEDURES

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I. IMPORTANT POINTS OF REPAIRING PROCEDURES

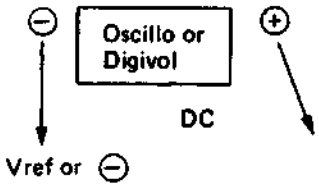
1. Measuring I/O Voltage

(1) Measuring data-input/output voltage (TV, SV, AV, and BV)
   a. Measure I/O voltage in the B.C. mode.
   b. Reference voltage, Vref = 1.8V
      Connect the negative terminal of the tester to the Vref and the positive one to a data-input check point.

(2) Measuring items other than data-input/output voltage
   a. Select a mode to be checked.
   b. Reference voltage is negative power source.
      Connect the negative terminal ⊖ to the negative power source and the positive terminal ⊕ to a point which should be checked.

2. Interpretation of Symbols

(1) Measuring method



a. Oscillo.....Oscilloscope
b. Digivol.....digital coltmeter or digital tester
c. ⊖→ Vref or ⊖ ...connect the negative terminal of the tester of Vref or the negative power source.
d. ⊕→ .....connect the positive terminal of the tester to a point to be checked.
e. DC.....Use the DC range of the tester for checking.

(2) Troubleshooting

a. E12.....indicates the page on which checking procedures or reference matter are described.

(3) Specified voltages
Unless otherwise specified, voltages specified in diagrams indicate approximate levels.

(4) Indication of IC terminals
Head amplifier..... H, for example H6
Bipolar IC A ..... A, for example A5
Bipolar IC B .....B, for example B10
CPU.....C, for example C50

3. Handling of Oscilloscope

(1) Storage oscilloscope (memory type)
   a. Signals to be output constantly (ϕ signal, B.C. signal, and so on) can be checked by using a nonstorage oscilloscope.
      (When stopping display of waveforms, depress the FAST ARM and the START/STOP button in this order.)
   b. Observing single waveforms (such as integrated output, MG-1 ON and waveform displayed only upon shutter release).
      1) Set the oscilloscope to the FAST ARM and select a large time scale so that the whole view of the waveform can be observed. (0.5 s/vid, 0.1 s/vid, 50 ms/div, 20 ms/div, and so on)
      2) After observation of the whole waveform, select smaller time scales step by step to observe closely.
      3) After selecting an appropriate size of time scale, set the instrument to the SINGLE mode to stop the waveform.

      * A waveform may not be observed if a small time scale is selected from the begining.
      * Waveform may not be provided when the input voltage range (ordinate scale) is changed at randam. Select the voltage range by estimating possible ranges in advance.

* The LEVEL knob (upper right) should be turned full counterclockwise (FIX) in advance.

(2) If no storage oscilloscopes are available:

a. Use an ordinary oscilloscope for waveform checks. It is considered that the normal input/output voltage is provided if waveform moves.

4. Range Indication of the Oscilloscope

Although the range in the photographs of waveforms is based on the actual indication by the oscilloscope, all the probes are shown at the range of x10. So, read the voltage level in such photographs by multiplying by 10.

5. Repairing Procedures

(1) Diagnose symptom.

a. Check the battery. (Voltage, capacity, and the contact in the battery chamber.)

b. Prior to disassembling the main body, try various functions so that you may guess the possible malfunction or causes of the trouble through observing reactions. (Change modes, selecting self-timer or ESP, or converting SV, AV, TV, or BV)

c. If a trouble is not recognized:

1) Press the top cover (check of short circuit and disconnection).

2) Slightly move the flexible circuit board (check of defective through-hole in the flexible circuit board and disconnection of the circuit).

3) Pull each lead wire (to check poor soldering and disconnection).

4) Give shock to an IC with a dryer, if necessary, to check any abnormalities.

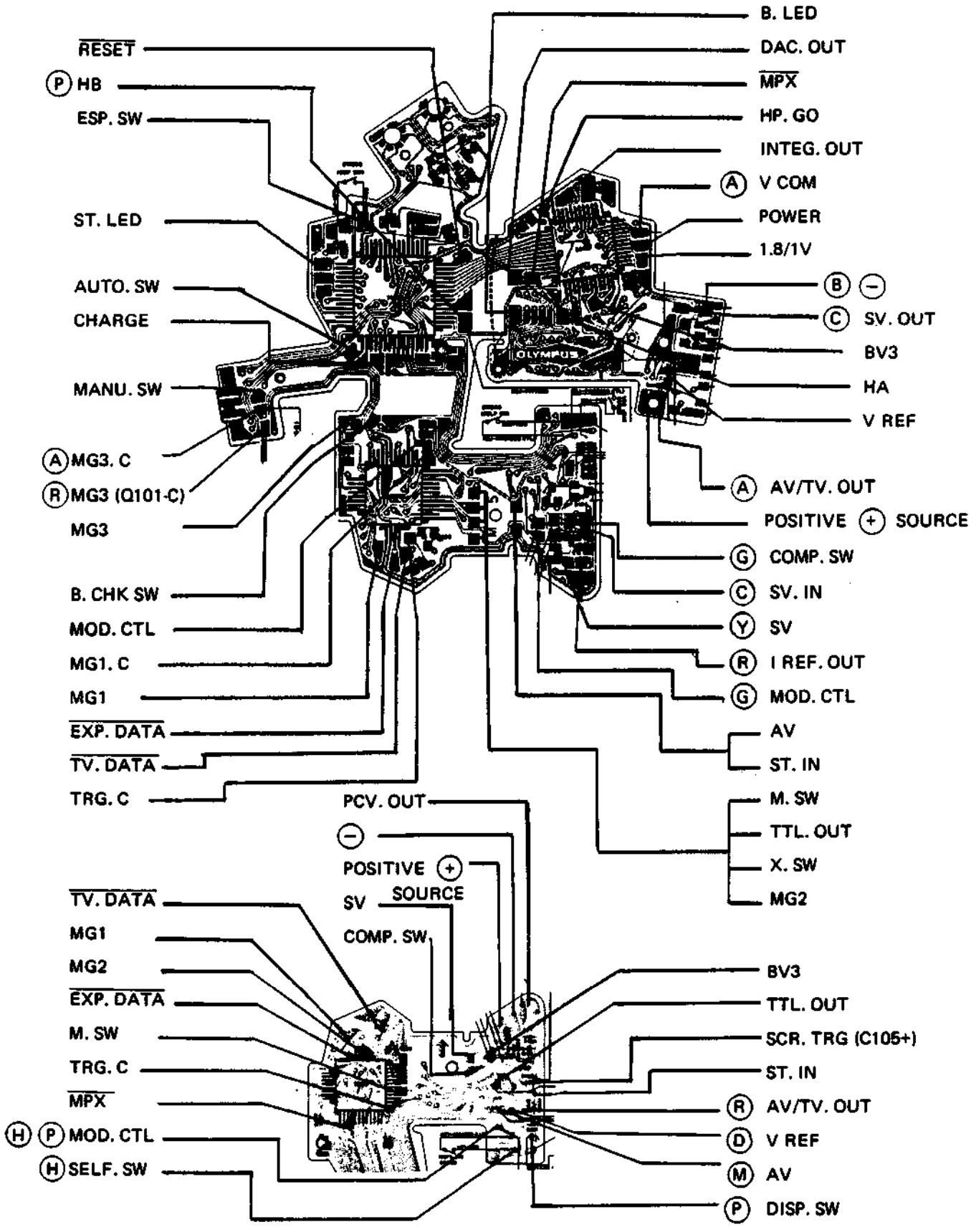
5) After a while, check the first operation.

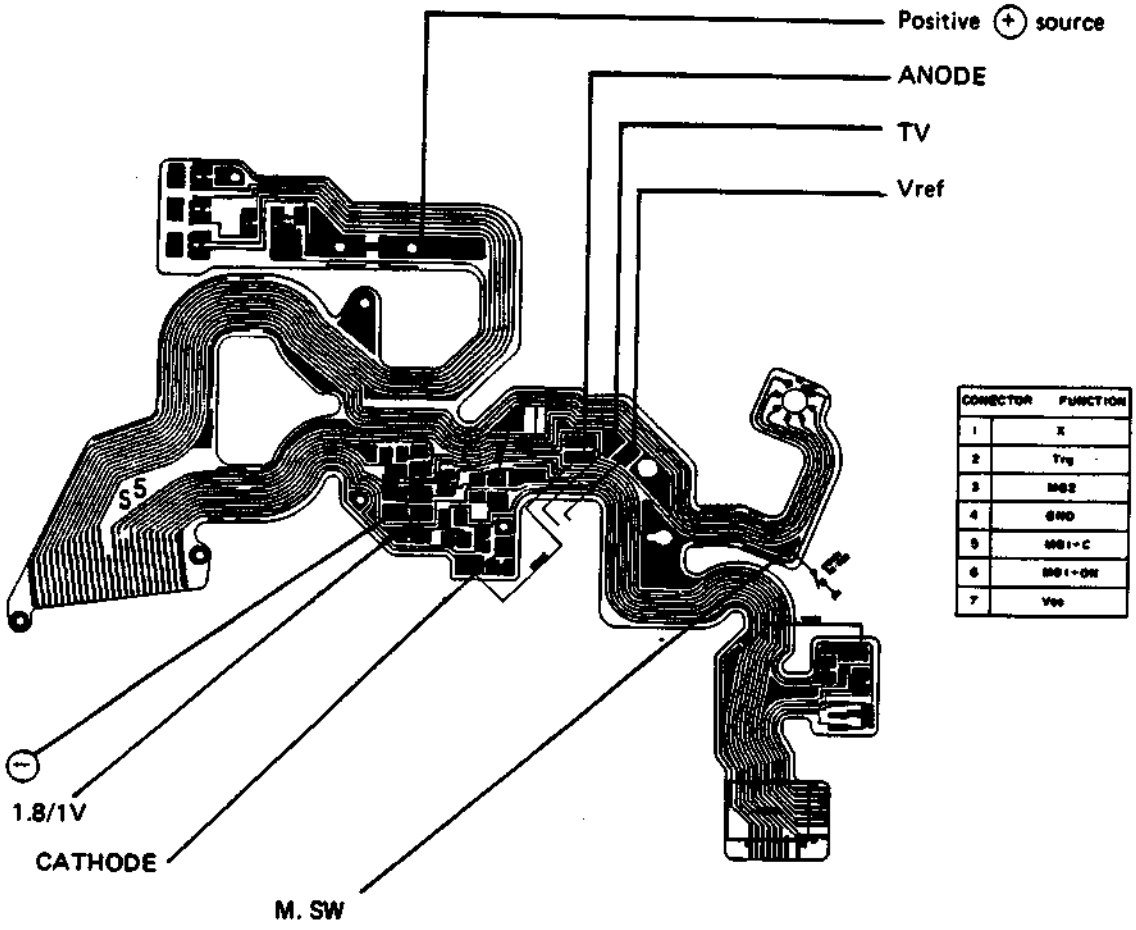
d. Correct indication first.

e. When check the operation after completing repair, be sure to reset the unit (to the B.C. mode) in advance.

II. CHECK POINTS ON CIRCUIT BOARD

1. M5 Circuit Board

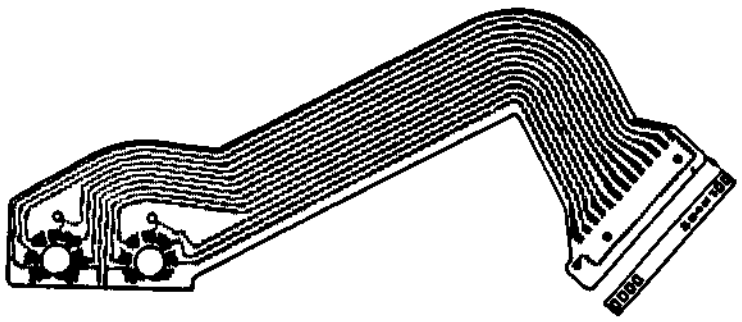




CONNECTOR	FUNCTION
1	X
2	Tvg
3	BIAS
4	GND
5	[illegible]
6	[illegible]
7	Vcc

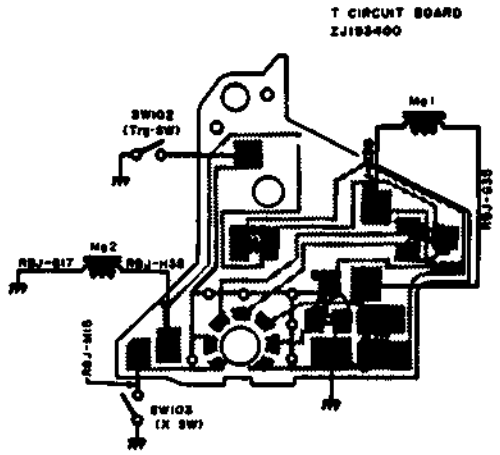
2. L5 Circuit Board

CONECTOR NO		For LED ON
LED	⊕NO	⊖NO
+ −	27	26
[redacted]	27	25
1	16	24
2	21	24
4	22	24
8	22	23
15	21	23
30	16	23
60	16	15
125	21	15
250	22	15
500	23	14
1000	21	14
[redacted]	16	14
M	27	13
P	27	12
ϟ	27	11

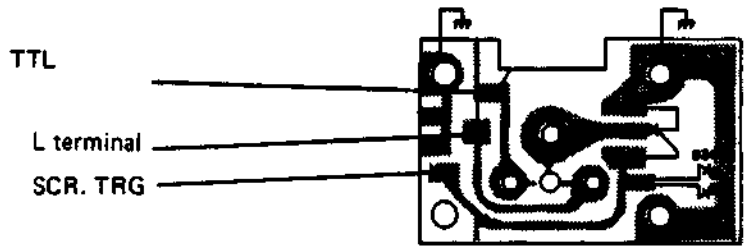


3. T Circuit Board

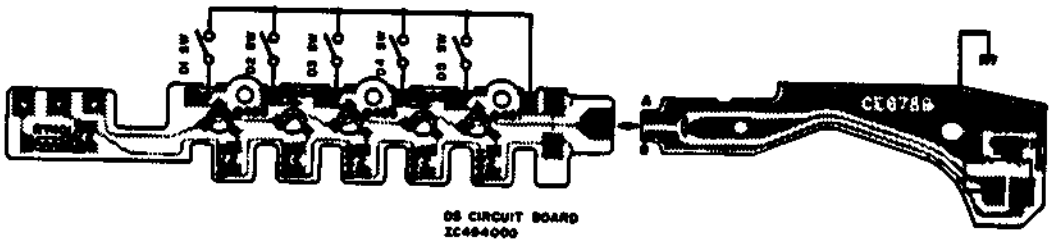
CONNECTOR	FUNCTION
1	X
2	Trg
3	M02
4	GND
5	M01-C
6	M01-ON
7	Vcc



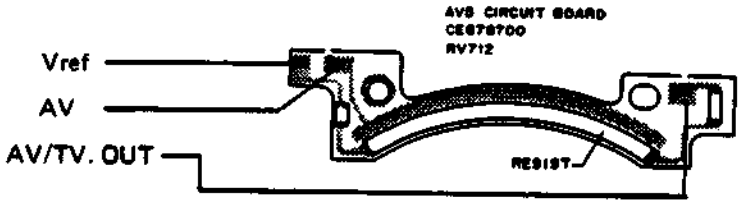
4. Upper Circuit Board 5



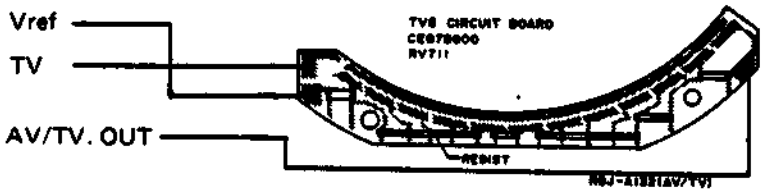
5. D5 Circuit Board



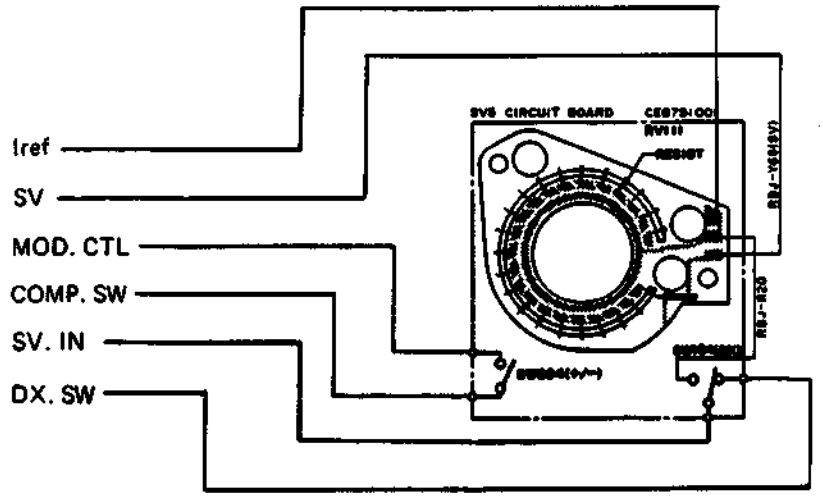
6. AV5 Circuit Board



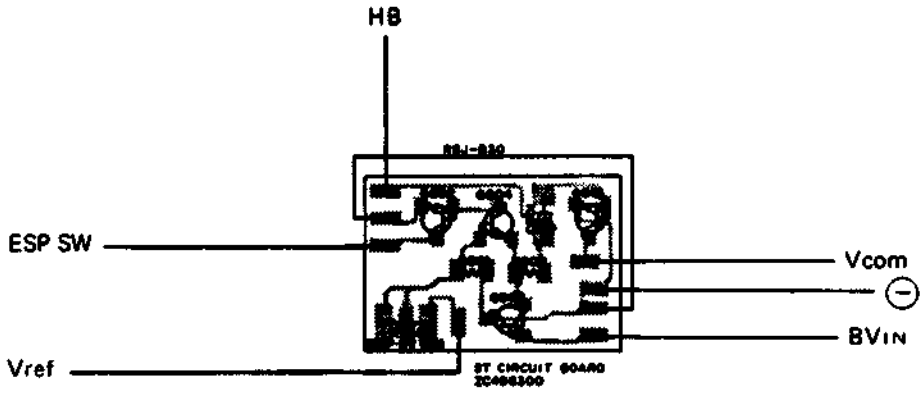
7. TV5 Circuit Board



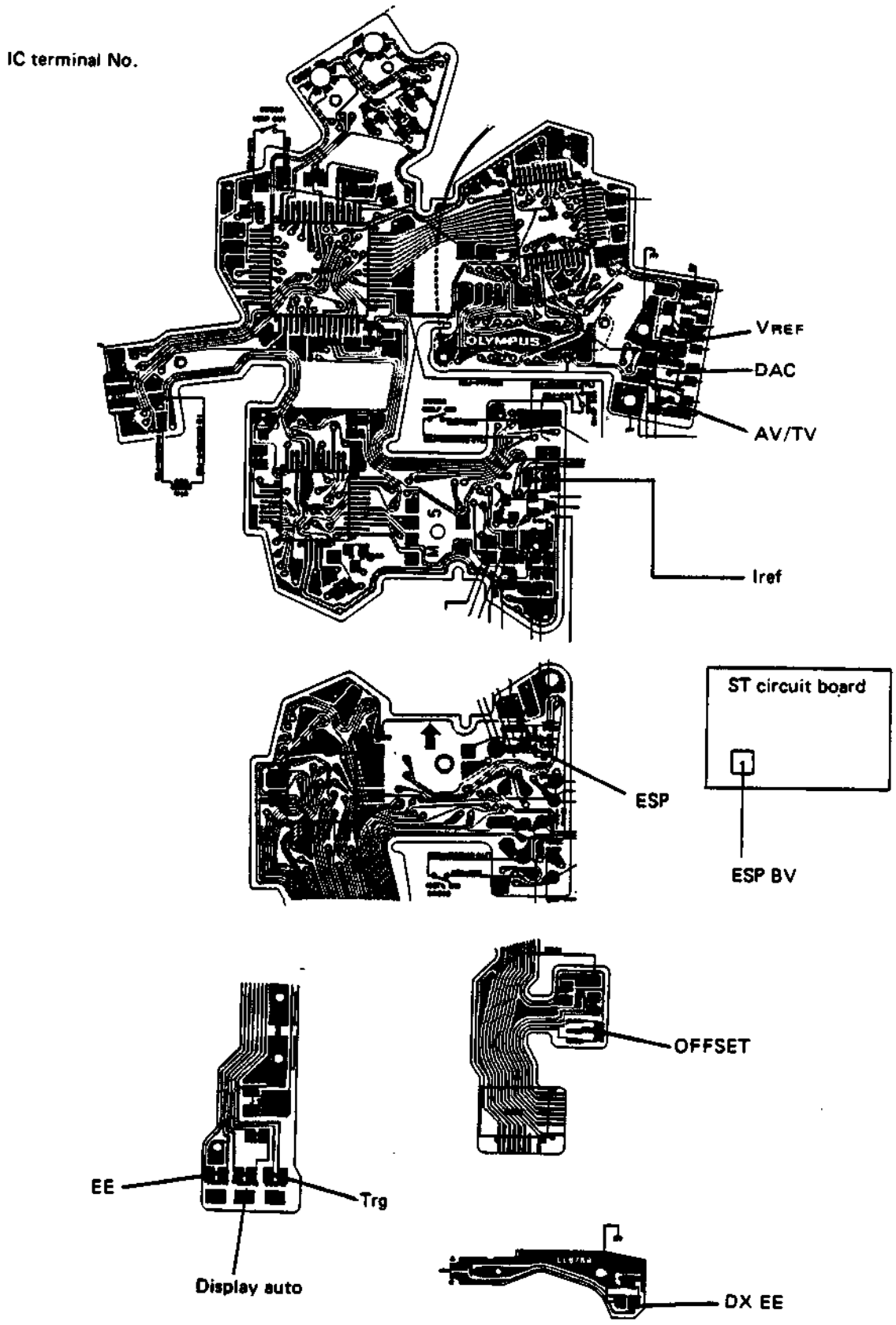
8. SV5 Circuit Board



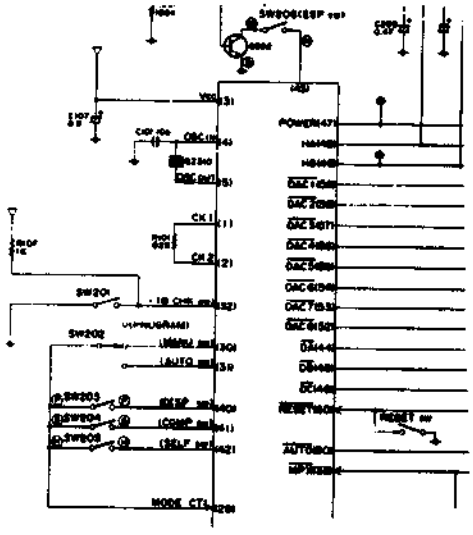
9. ST Circuit Board

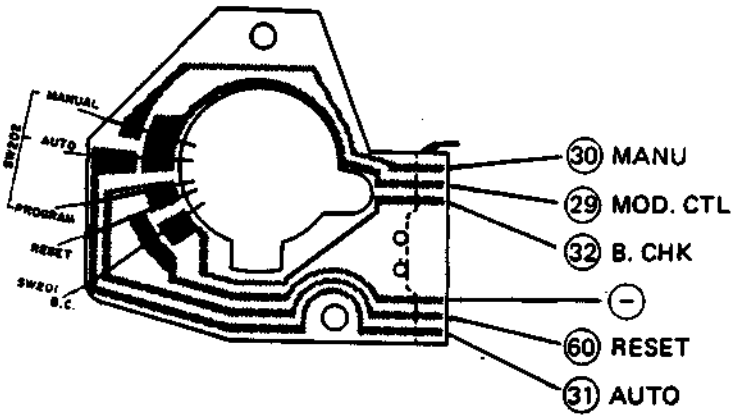


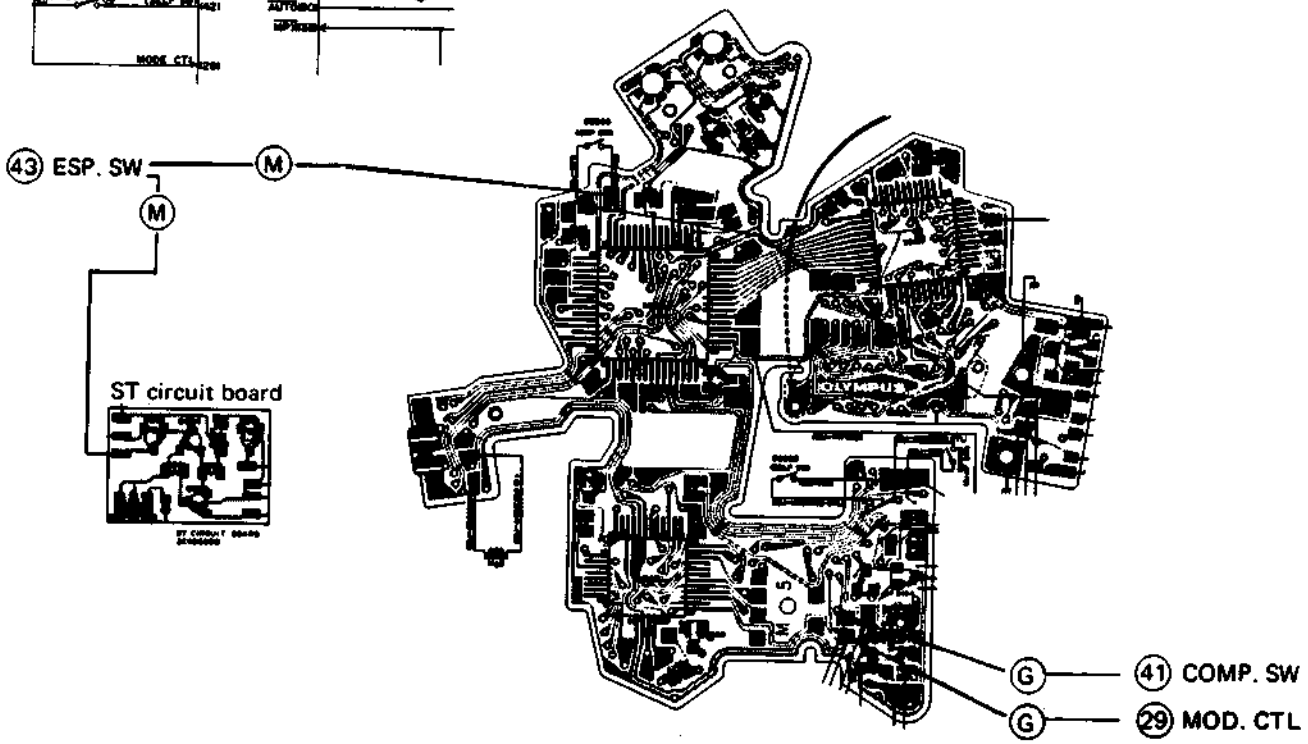
10. IC Pin Nos. and Adjusting VR's

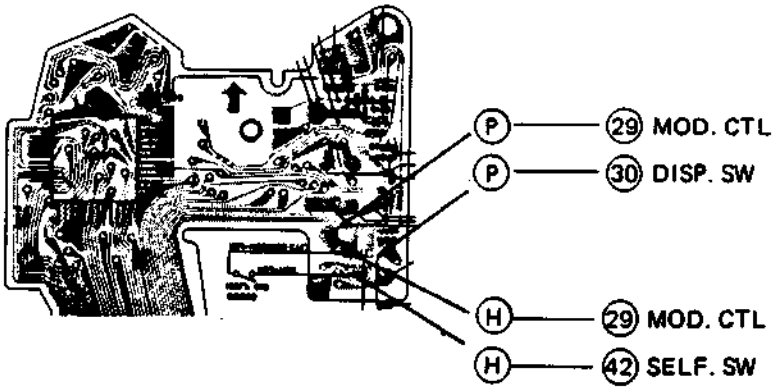


11. Mode-selecting Switch, Input Switch

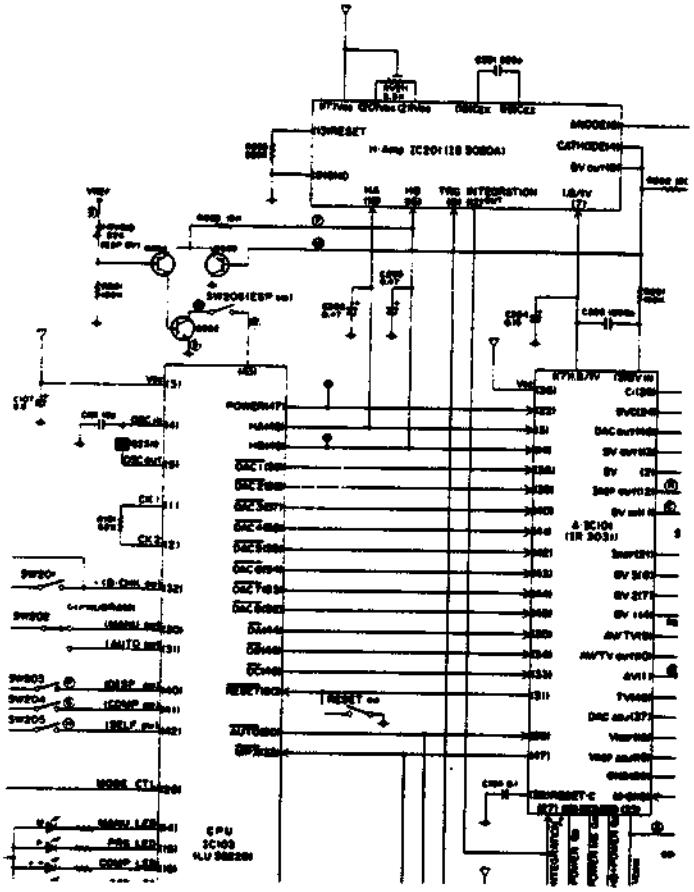








III. INPUT/OUTPUT VOLTAGE OF ELECTRIC CIRCUITS



1. Power Circuit

(1) CPU
- Mode selection
- DISP SW ON
- T series flash power ON
- (M. SW ON)

To be turned on by either of the above-mentioned operations.

(2) Head amplifier (H.A.)
To be turned on when either HA or HB is Ⓗ.

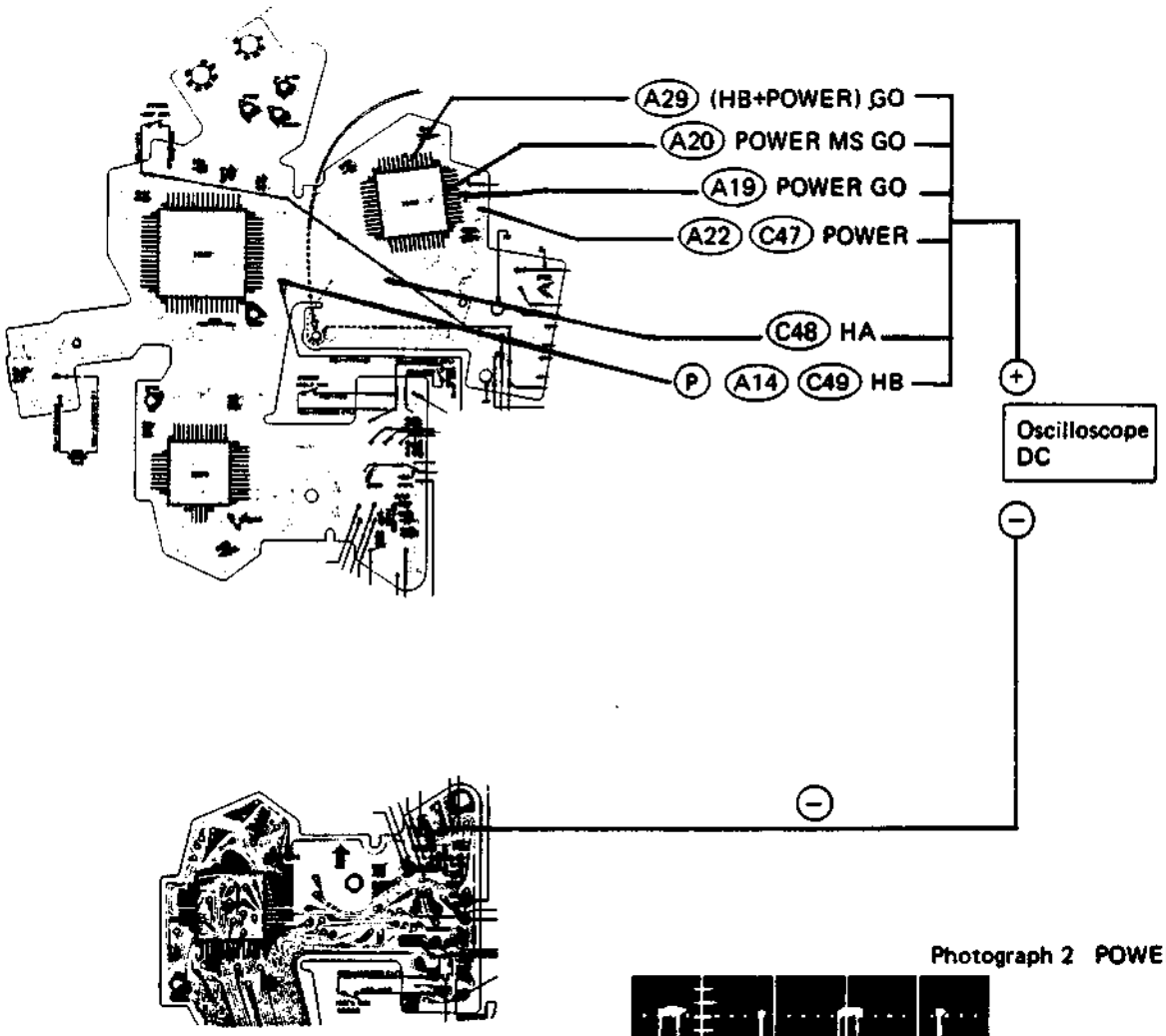
(3) Bipolar A (B.P.A.)
To be turned on when either POWER or HB is Ⓗ.

(4) Bipolar B (B.P.B.)
To be turned on
- when POWER is set to GO,
- when POWER MS is set to GO, or
- when (HB + POWER) is set to GO.

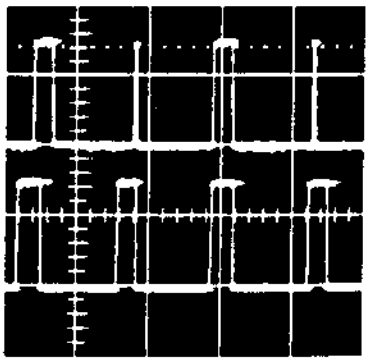
		HA	HB	POWER	POWER GO	POWER MS GO	(HB+POWER) GO
Indication OFF		0V	0V	0V	2V	2V	0V
Indication ON	Normal	3V	3V	(Photo-graph 2) E-11	(Photo-graph 3) E-11	2V	0.6V
	ESPON	(Photo-graph 1) E-11	3V			2V	0.6V
During exposure	Normal M	0V	0V	3V	1.8V	1.8V	0.6V
	A	3V	3V	3V	1.8V	1.8V	0.6V
	P	3V	3V	3V	1.8V	1.8V	0.6V
	ESPON M	0V	0V	3V	1.8V	1.8V	0.6V
	A	3V	3V	3V	1.8V	1.8V	0.6V
	P	3V	3V	3V	1.8V	1.8V	0.6V

* Normal = ESPOFF

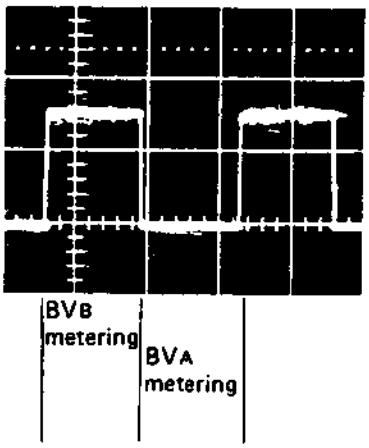
M = MANUAL
A = AUTO
P = PROGRAM



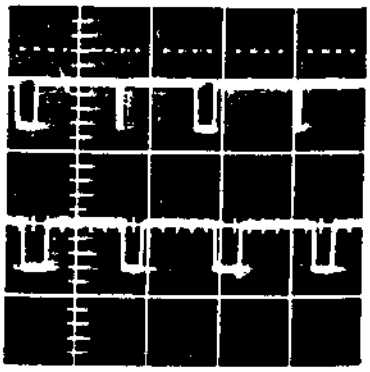
Photograph 2 POWER



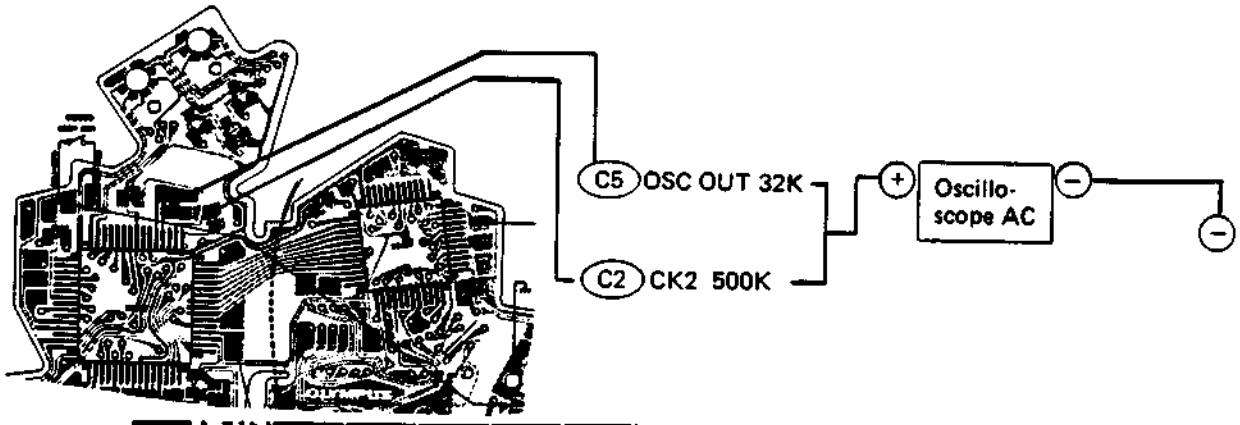
Photograph 1

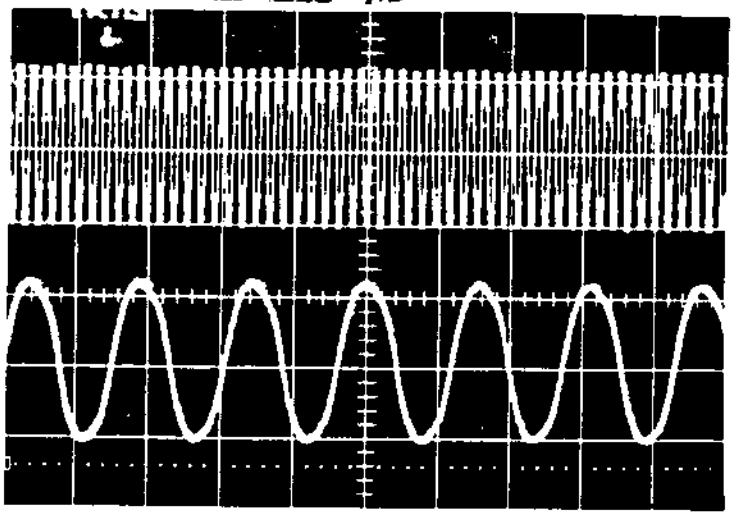


Photograph 3 POWER GO



2. Oscillating Circuit

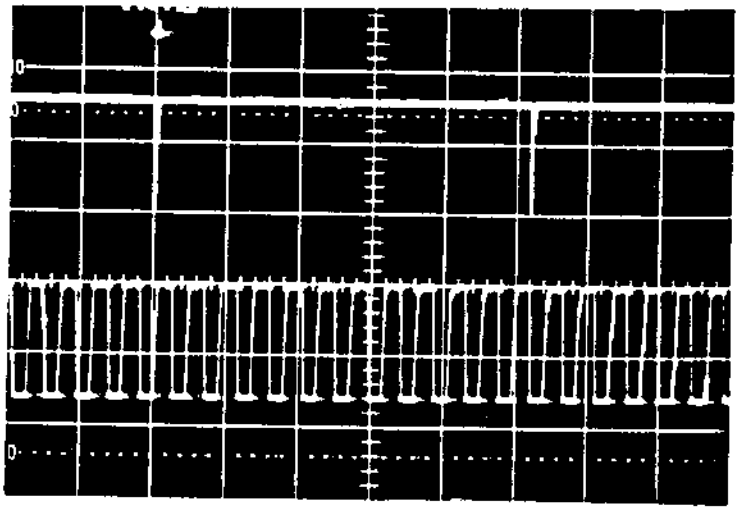




C5 ϕ Signal

AC 0.1V 20mS

AC 0.1V 20μS

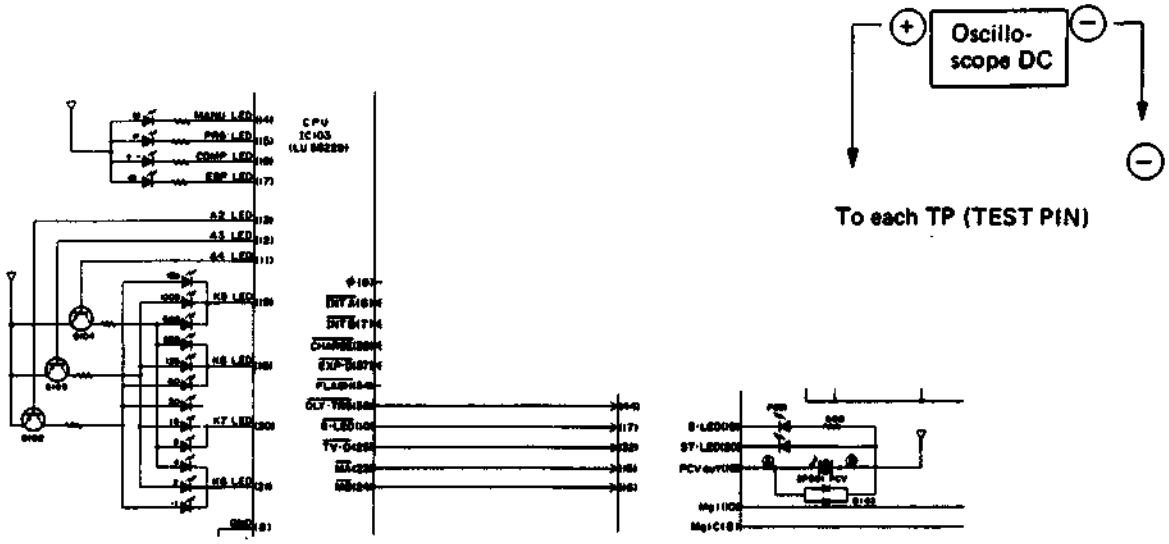


C2 System clock

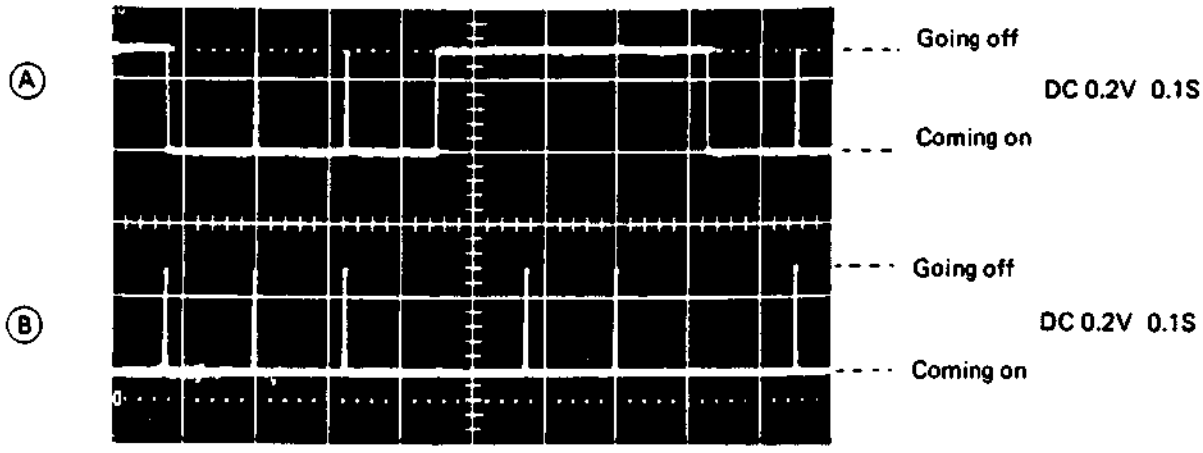
AC 0.2V 20mS

AC 0.2V 5μS

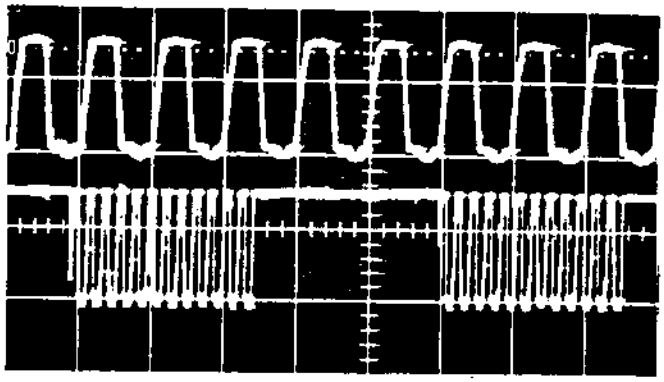
3. Indicating Circuit



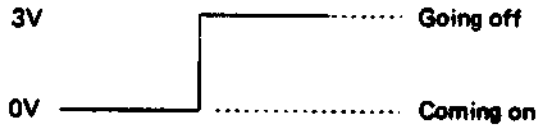
C16	+–	Waveform A	
C14	M	Waveform B	
C15	P	Waveform B	
C17	◘	Waveform B	
C11	A4 (4,8,250,500)	Waveform B	
C12	A3 (2,15,125,1000)	Waveform B	(When 1000 is blinking, signal A is selected.)
C13	A2 (1,30,60, (◎))	Waveform B	(When (◎) is blinking, signal A is selected.)
C19	K5 (500,1000, (◎))	Waveform B	(When 1000 and (◎ are blinking, signal A is selected.)
C18	K6 (60,125,250)	Waveform B	
C20	K7 (8,15,30)	Waveform B	
C21	K8 (1,2,4)	Waveform B	



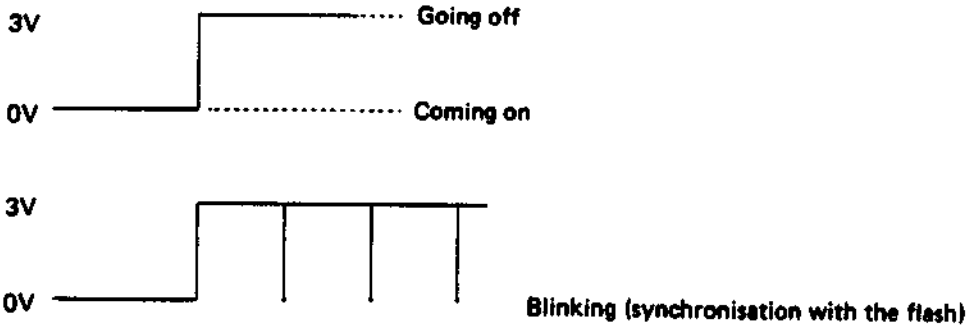
(B19) PCV OUT



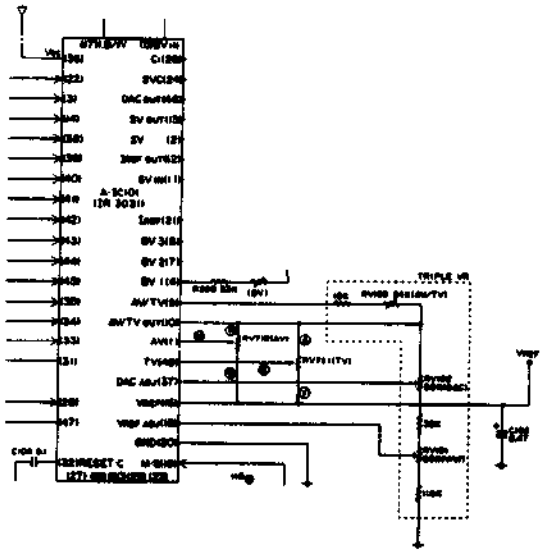
(B18) B LED



(B20) ST LED



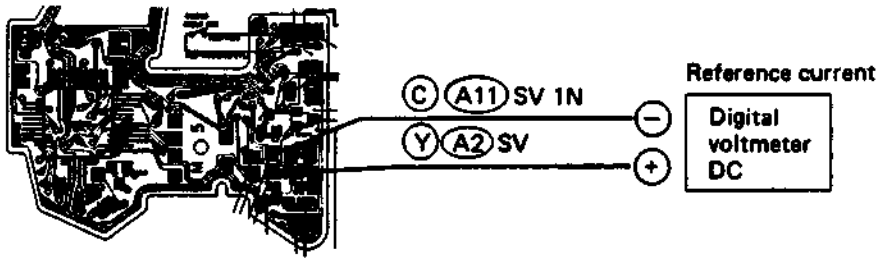
4. Reference Voltage/Current Circuits



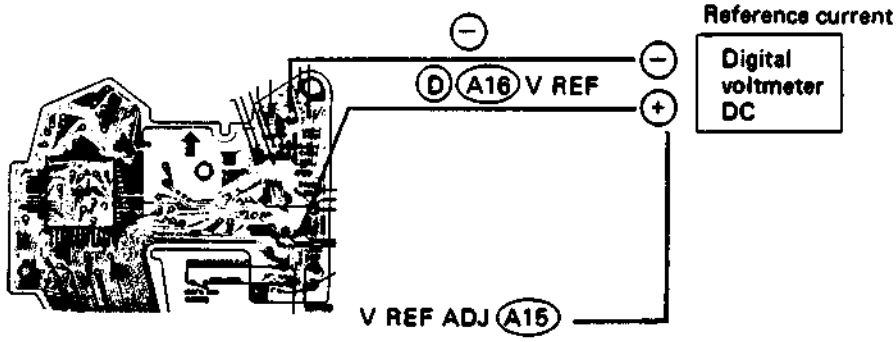
(1) Reference current circuit
- This is a temperature compensation circuit. If this current is out of standard value, all the circuits are disturbed.
- Check it with ISO3200 in the B.C. mode.

(2) Reference voltage circuit
- If the Vref is out of standard value, all the circuit will be disturbed.

(These circuits should be adjusted in the test mode. See No. D–41 and 42.)



SV ≒ 126mV

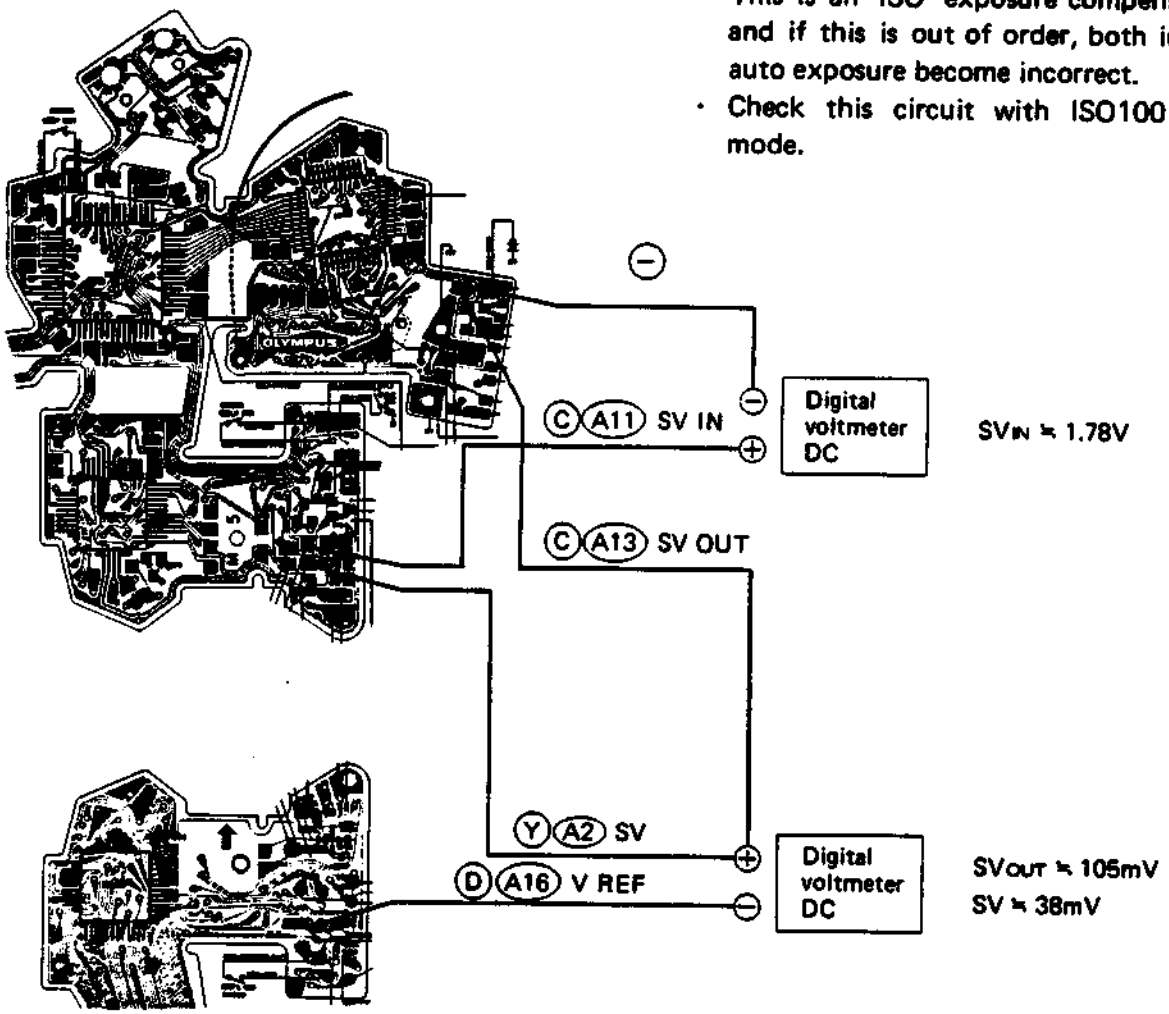


Vref ≒ 1.78V

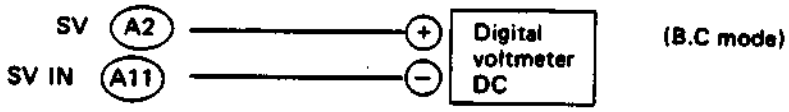
Vref ADJ ≒ 1.28V

5. SV Circuit and EE-Adjusting Circuit

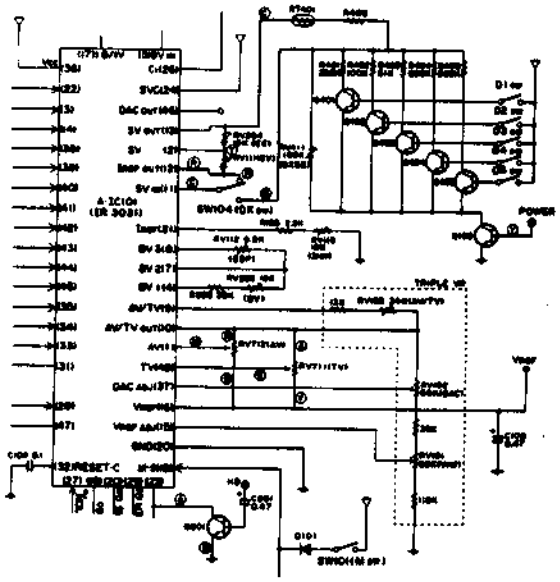
- This is an ISO exposure compensation circuit, and if this is out of order, both indication and auto exposure become incorrect.
- Check this circuit with ISO100 in the B.C. mode.



- ISO resistance
  High – high resistance – high voltage
  (ISO3200 ≒ 128mV)
  Low – low resistance – low voltage
  (ISO25 ≒ 5.5mV)

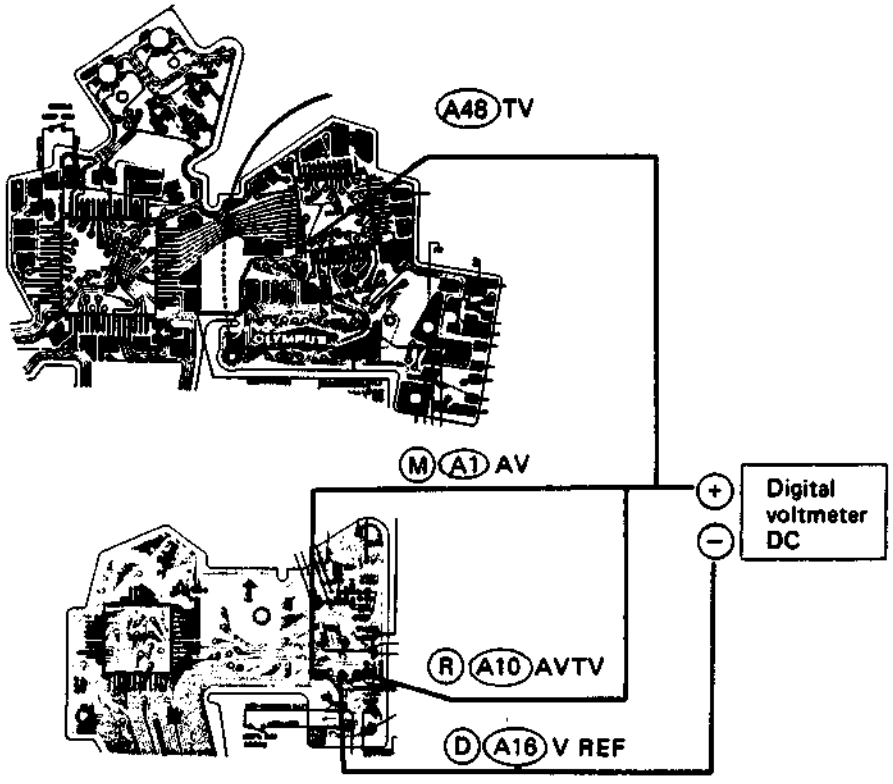


6. TV/AV Circuit



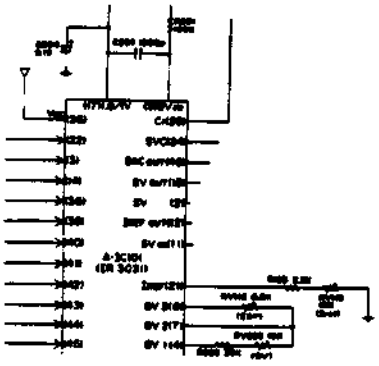
- This is a circuit in which aperture value and shutter data are entered. If this is out of order, manual time becomes incorrect or indications will not be changed in response to the aperture or shutter dial setting.
- Check in the B.C. mode.
- TV: shutter time
  201mV at bulb. Each 18mV is decreased per step.
- AV: aperture value
  132mV at full open. Each 18mV is decreased per step.

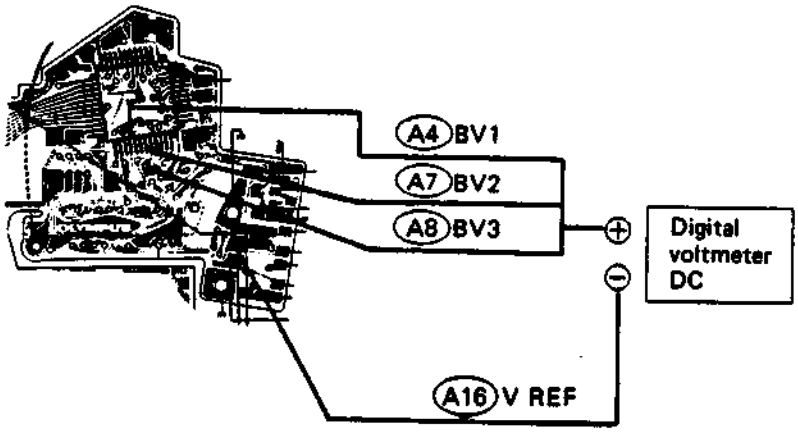
TV ≒ 201mV (bulb)
AV ≒ 132mV (F1.8)
AVTV ≒ 201mV



7. BV Level Shift Circuit

- This is a BV input circuit in the finder.
- Check in the B.C. mode.

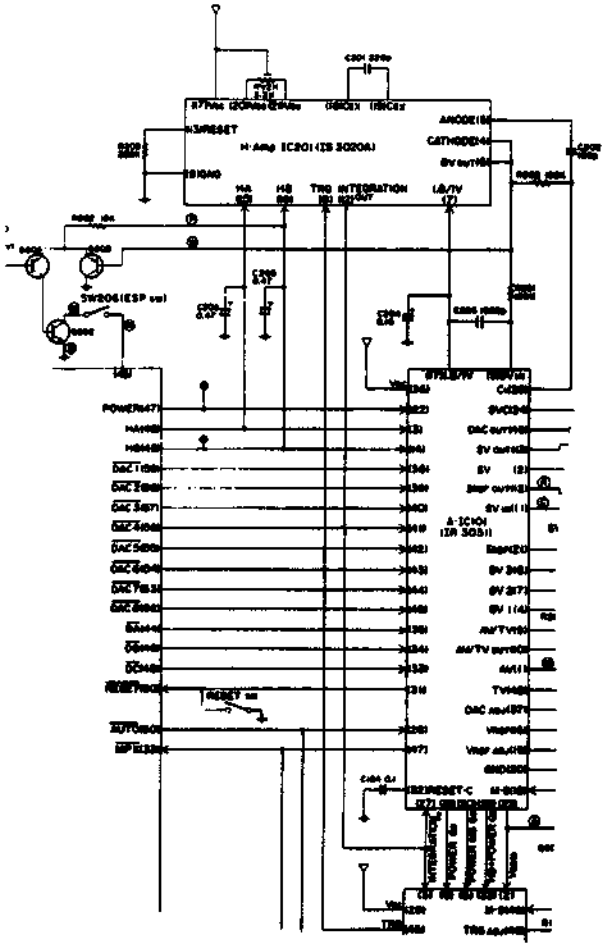




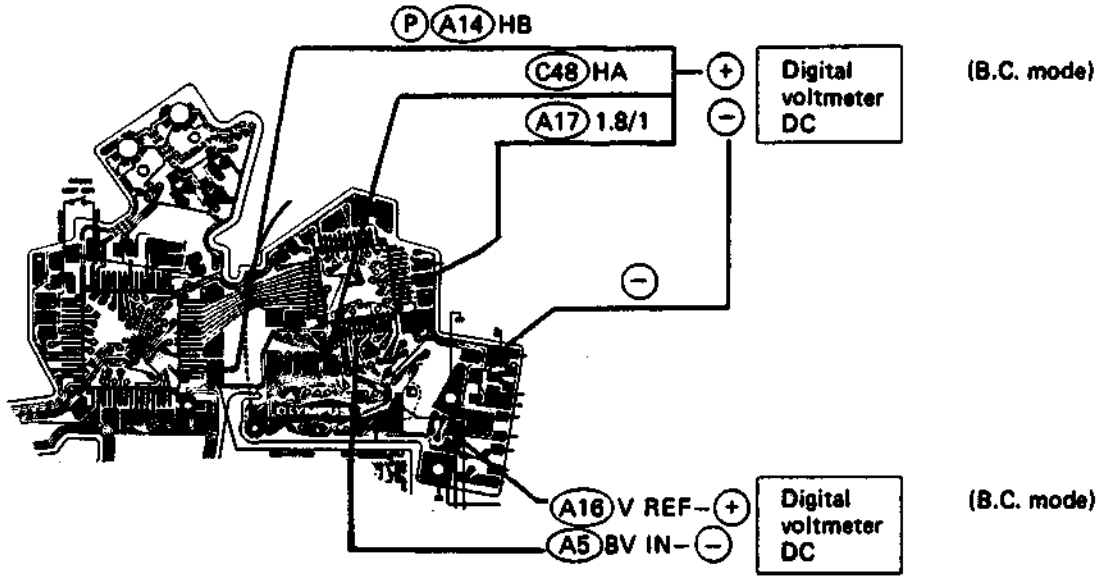
$BV_1 \fallingdotseq \ominus$ 960mV
$BV_2 \fallingdotseq \ominus$ 630mV
$BV_3 \fallingdotseq \ominus$ 600mV

- Resistance value
  36 KΩ ≒ between BV_1 and BV_2
  3.5 KΩ ≒ between BV_2 and BV_3

8. Head Amplifier (H. A)

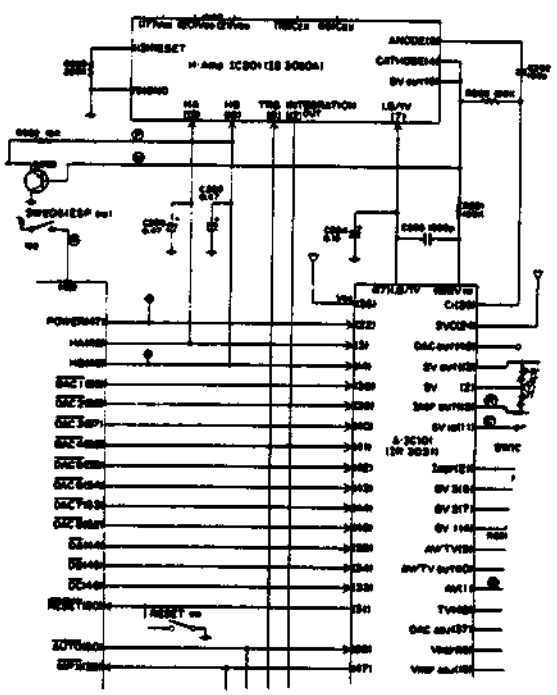


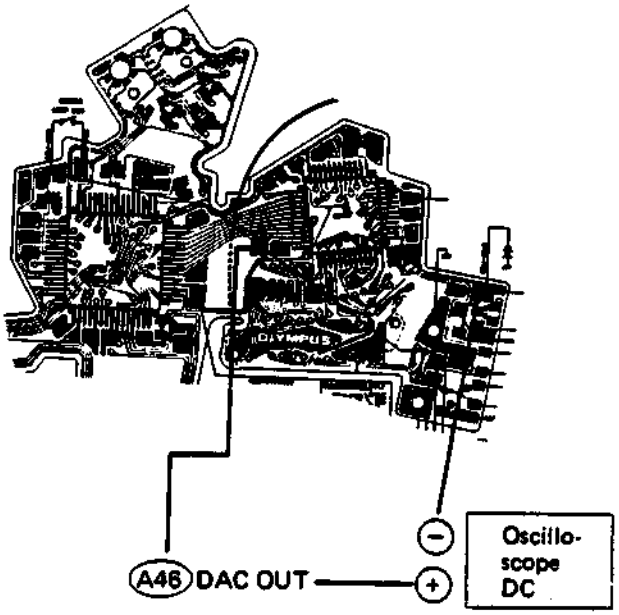
- HA changes over photosensors.
  - (H) (3V) . . BVB (average metering)
  - (L) (0V) . . BVA (metering of center area)
- HB changes over indicating or exposure mode.
  - (H) (3V) . . .indicating mode
  - (L) (0V) . . .exposure mode
- 1.8/1V selects reference voltage of the H.A.
  Indicating mode 1.8V
  Exposure mode 1.0V
- BVOUT
  Output for indication and manual operation.
- INTEGOUT
  Output for TTL direct metering.



SVIN ≒ ⊖ 110mV (dark) ~ ⊖ 300mV (bright)

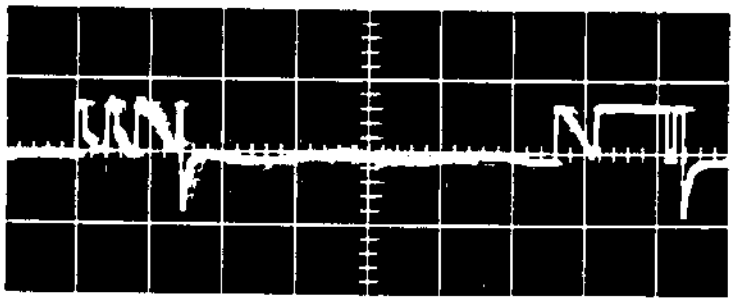
9. DAC Circuit





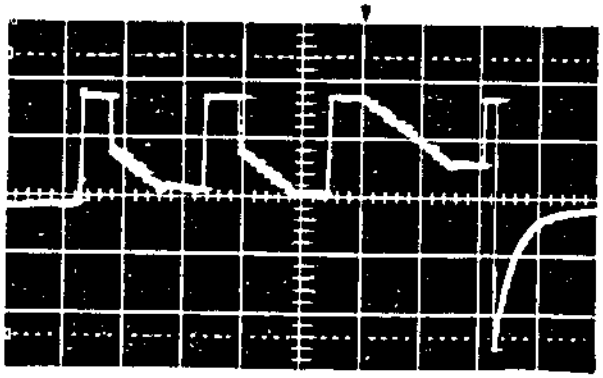
A46 DAC OUT (AUTO ESPON)

DAC outputting order
TV (Manual operation)
SV
AV
BVB
BVA (when ESP is ON)

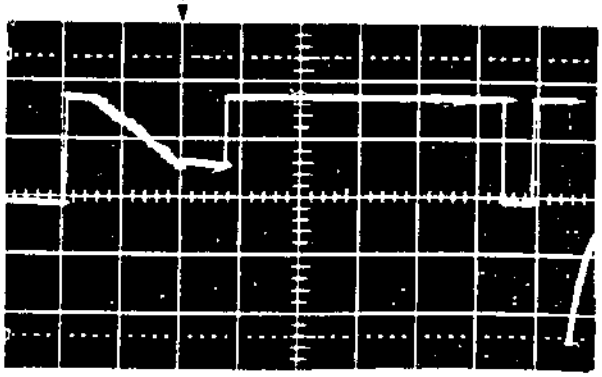


DC
50mV 10mS

DC 20mV 2mS

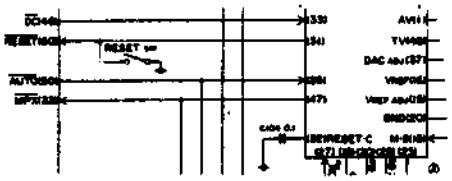


SV AV BVB



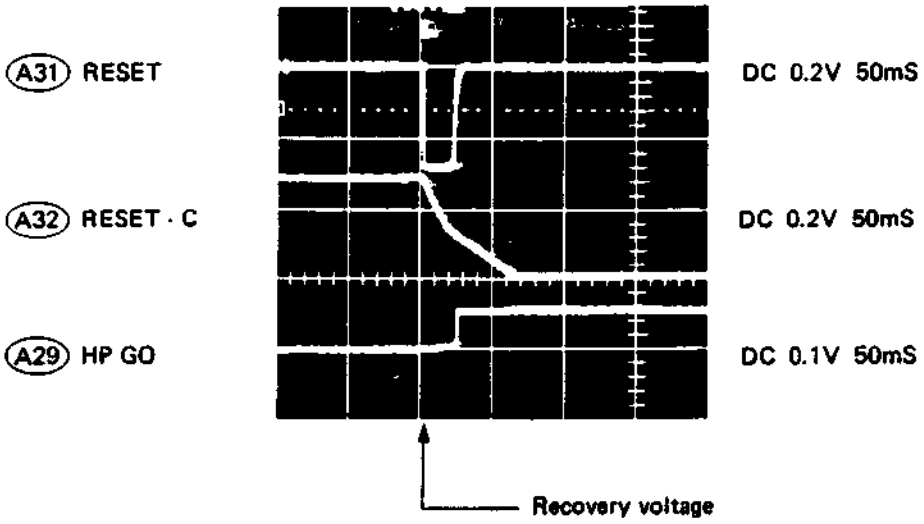
BVA

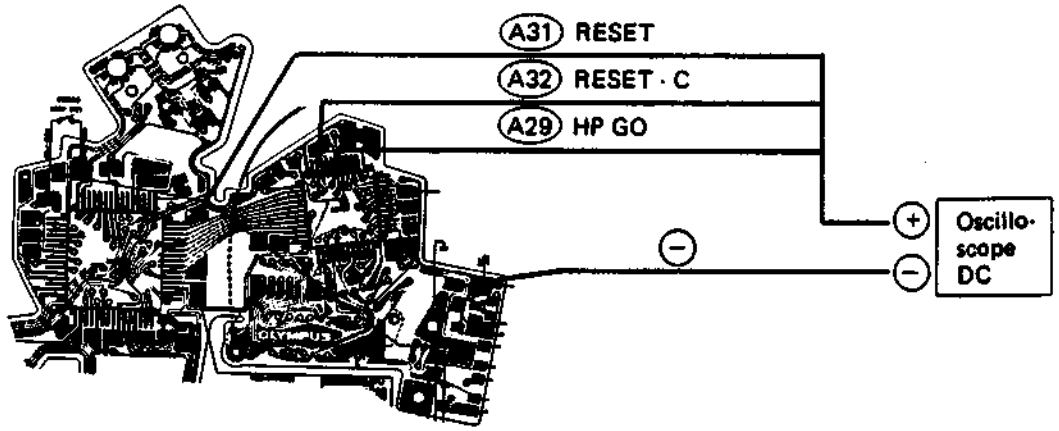
10. Reset Circuit



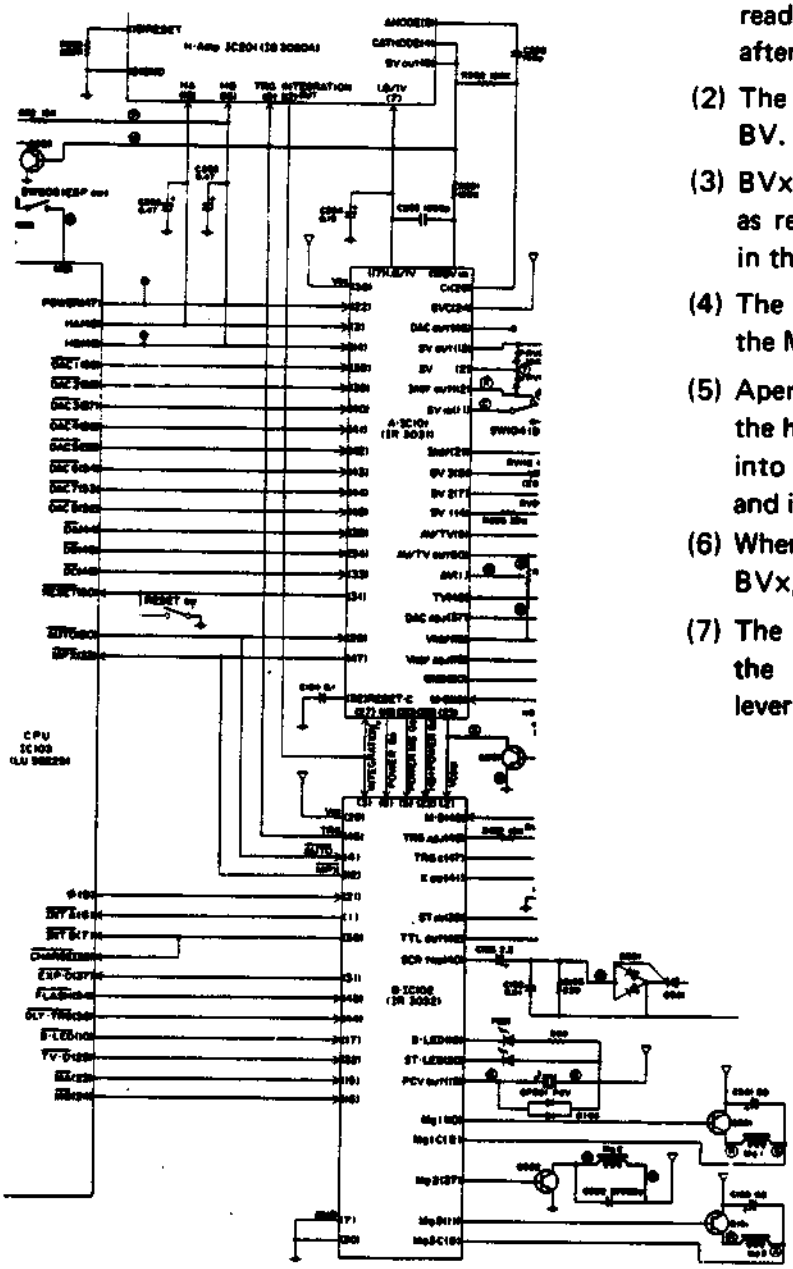
(1) Functions of the reset circuit

- When the power reaches the recovery voltage of 2.85V after locking, automatic resetting is effected.
- When the mode is changed from B.C. to PRGM or vice versa, manual resetting is effected.





11. Aperture-Control Circuit and MG3-Driving Circuit (program mode)



(1) When the M.SW is turned on, these circuits read SV and BV and inform them to the CPU after effecting A/D conversion.

(2) The CPU calculates BVx based on the SV and BV.

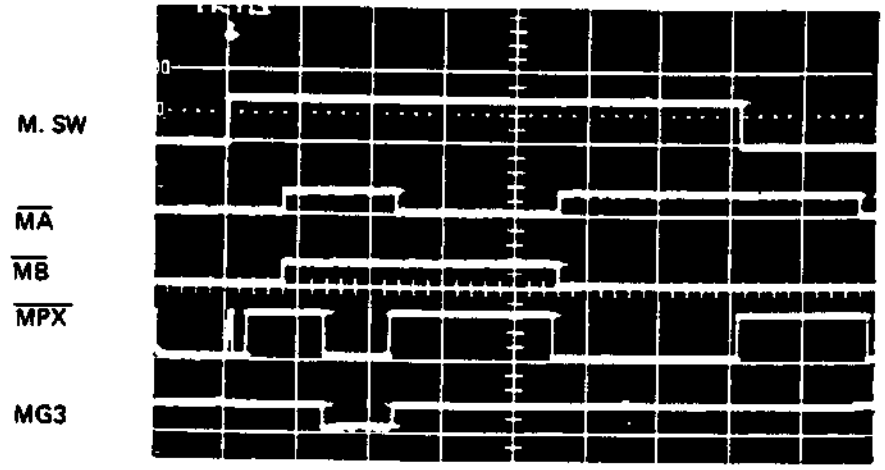
(3) BVx is subjected to A/D conversion to be used as reference voltage of aperture-control circuit in the B.P.A.

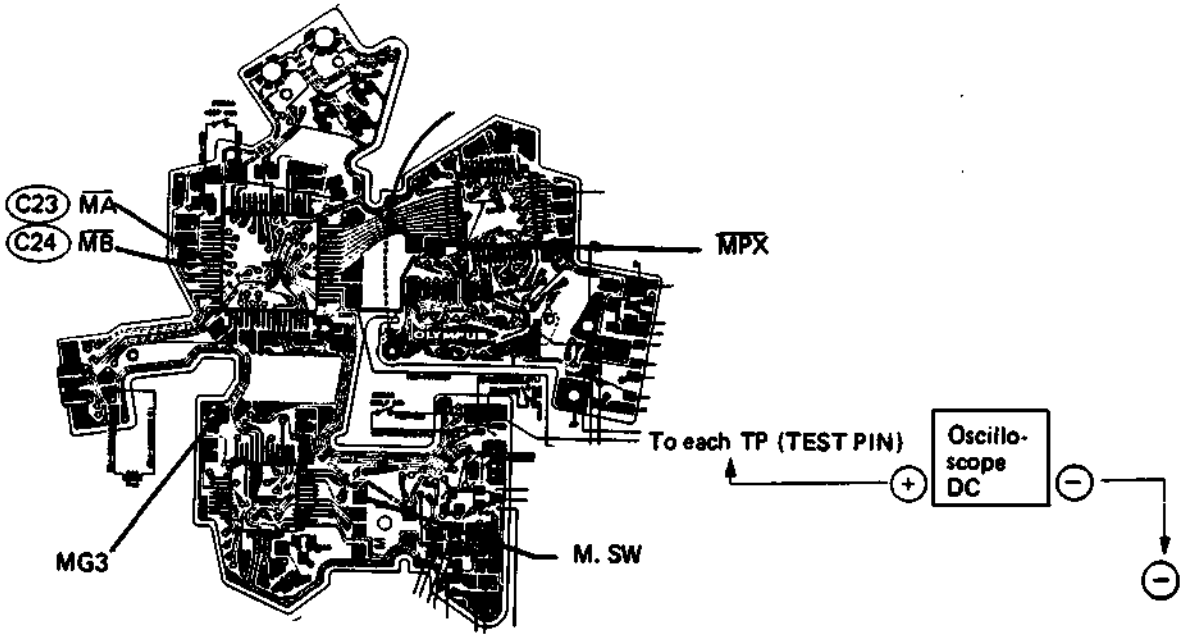
(4) The CPU provides $\overline{MA}$ and $\overline{MB}$ signal to (H), the MG3-drive circuit in standby condition.

(5) Aperture is actually narrowed and BV out from the head amplifier is lowered. The output is fed into the aperture-control circuit through (A5) and is compared with BVX.

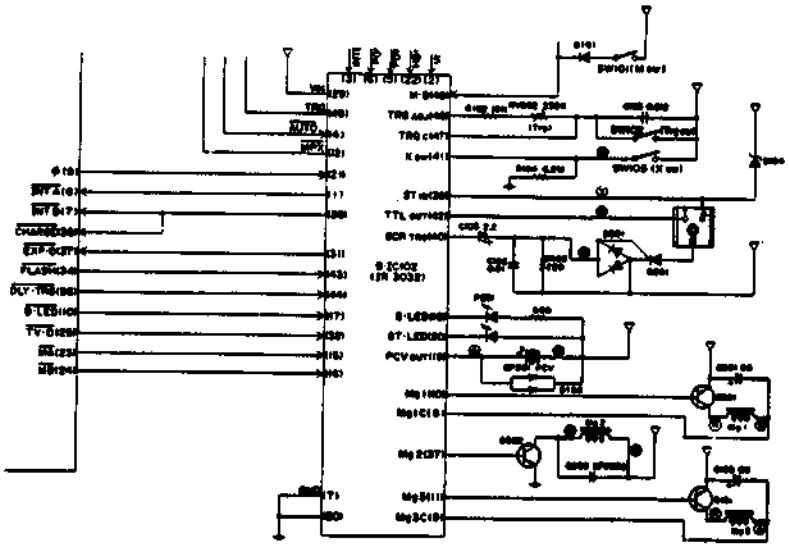
(6) When the BVOUT becomes smaller than the BVx, $\overline{MPX}$ (L) is output to the (B12).

(7) The signal $\overline{MPX}$ (L) sets the (B11) to L, and the MG3 is turned on to stop the aperture lever.

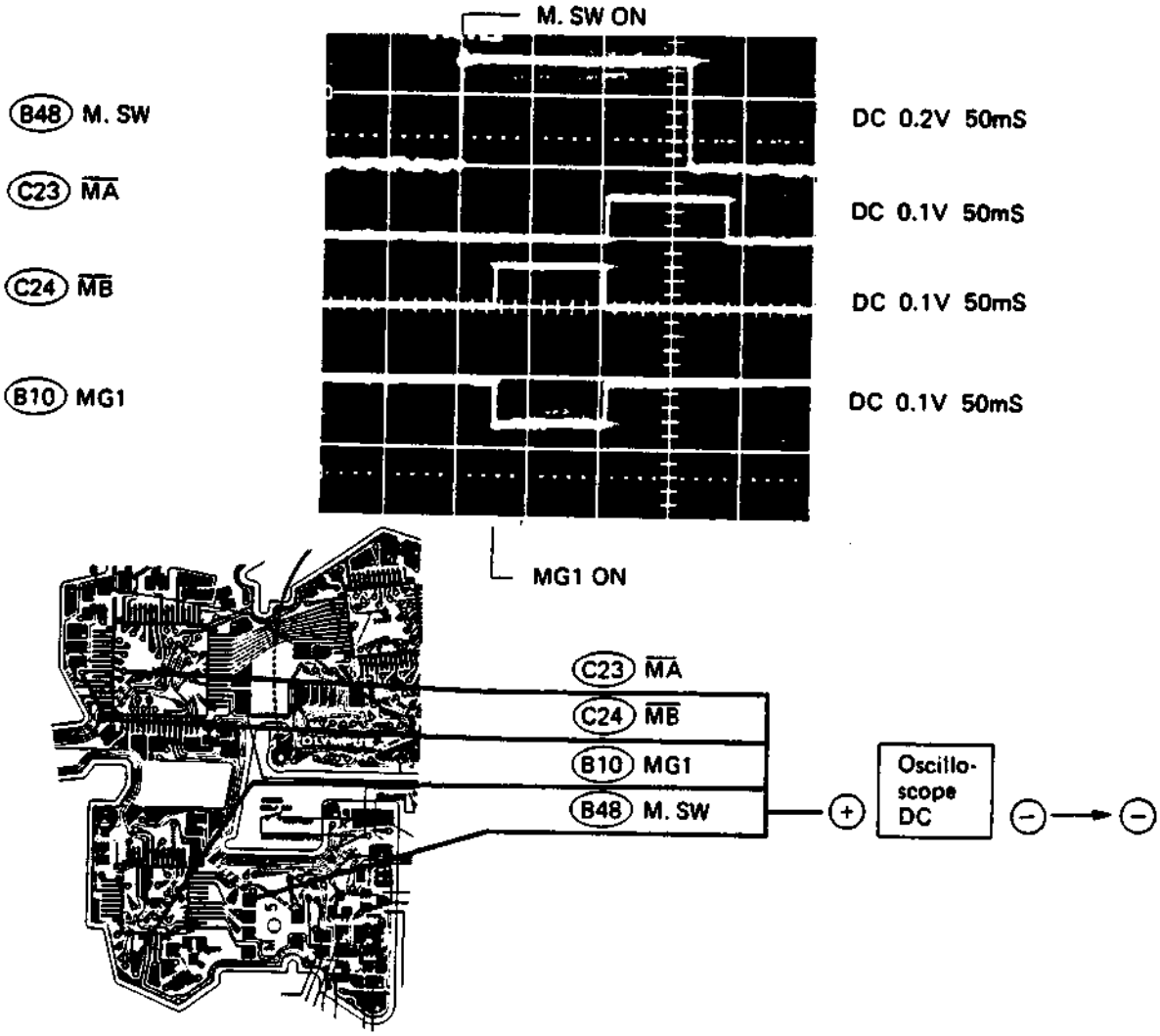



C23 MA
C24 MB
MPX
To each TP (TEST PIN)
Oscillo-scope DC
MG3
M. SW

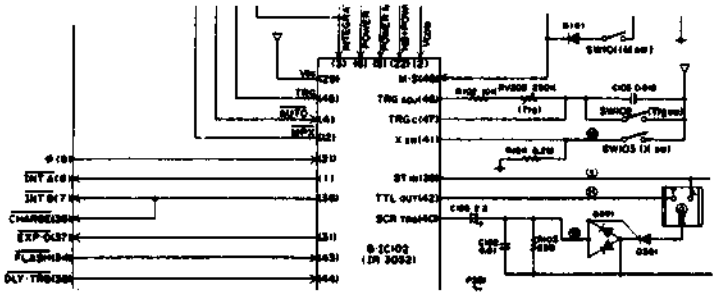
12. MG1-Driving Circuit



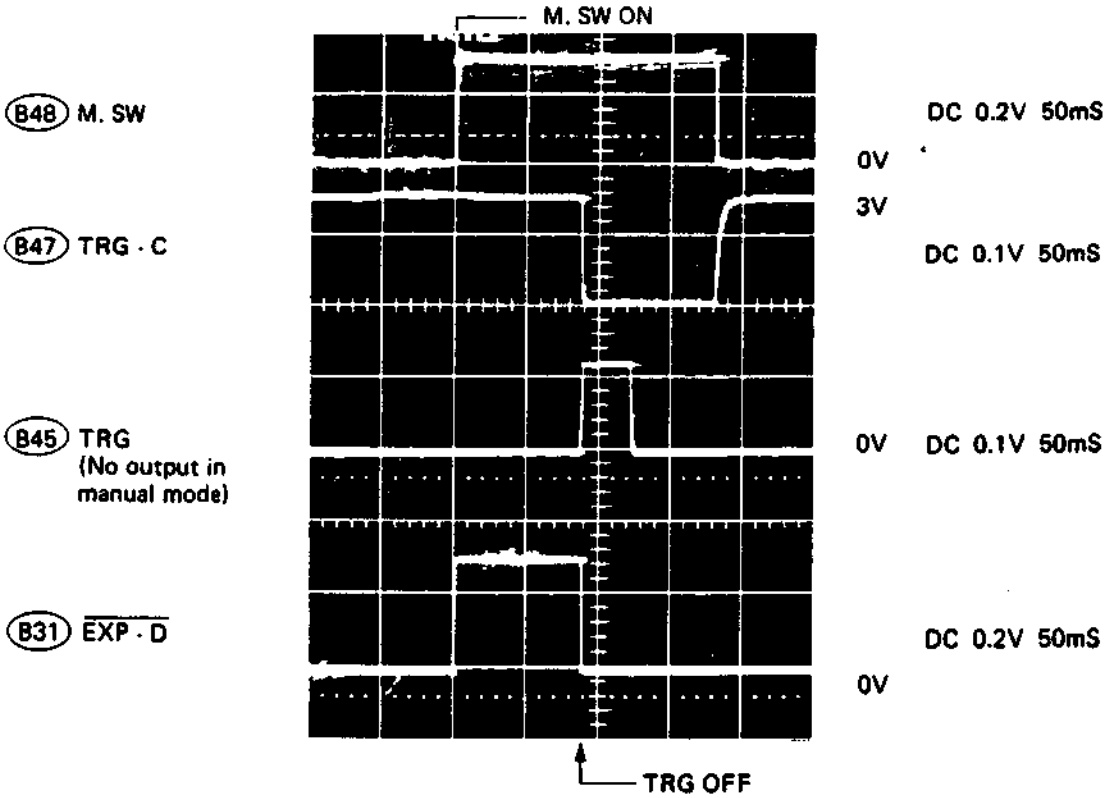
- When the M. SW is turned on, the MB (H) signal is produced in about 23mS (auto) or 27mS (manual) to turn the MG1 on.

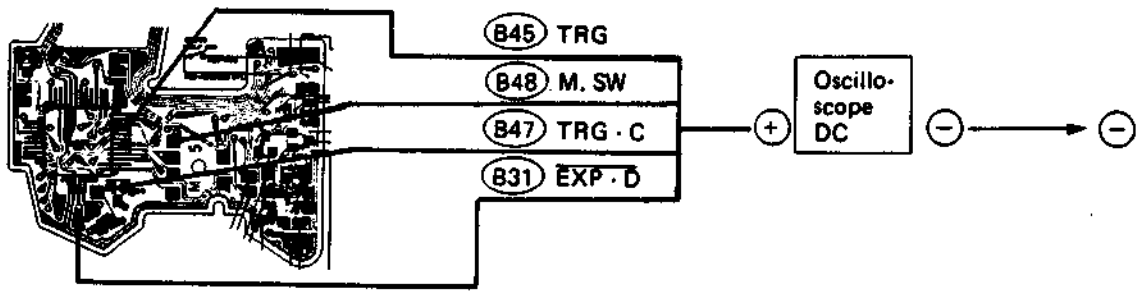


13. Trigger Driving Circuit

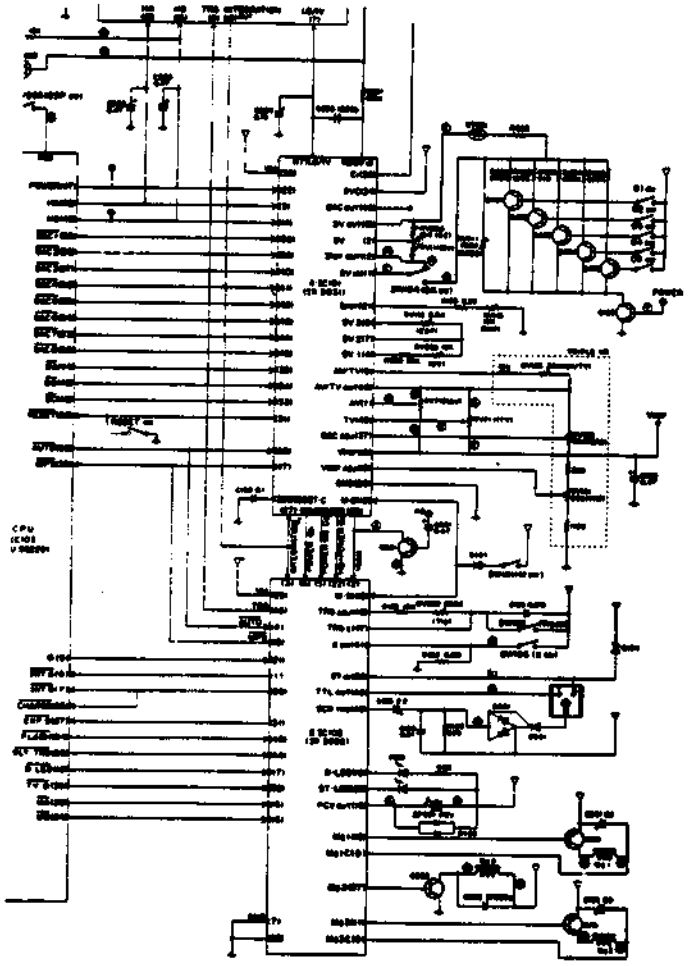


- In about 85mS after turning on the M. SW, the TRG SW is turned off.
- TRG is turned to waveform in the IC, and
  1. it informs start of integration to H.A.
     (B45) – (H) → (H8) TRG
  2. it informs start of integration to CPU.
     (B31) – (L) → (C37) $\overline{\text{EXP}}$ · D





14. Auto Time Circuit



(1) This circuit informs each IC that the M. SW has been turned on and turns on the MG2.

M. SW – (H) → (A18)
(B48) - - - - - - - -
$\overline{\text{INT A}}$ (C6) ← (L) – (B1) <- - -

(B37) MG2 – (H) → MG2

(2) Turning on the M. COMP. and read the SV value to take it as reference voltage.

(C50) $\overline{\text{AUTO}}$ – (L) → (B4) - - - -
M. COMP <- - - - -
(A2) SV - - - - → (A23) → (B2) VCOM
M. COMP <- -

(3) Turning on the MG1 and change over the reference voltage of the H.A. to 1V.

(C24) $\overline{\text{MB}}$ – (H) → (B16) - - - - -
MG1 ← (L) – (B10) <-
(C49) HB – (L) – (A14) - - - - -
(H7) ← (1V) – (A17) <-

(4) When the Trg switch is turned off, informs TRG off to the H.A. and the CPU.

TRG SW —— (B47) -┬-> (B45) —— (H) —→ (H8) TRG
└-> (B31) —— (L) —→ (C38) $\overline{\text{EXP D}}$

(5) The integral voltage enter the M. COMP. from the H.A. If M. COMP. voltage becomes higher than Vcom, the M. COMP. is reversed to complete the integration.

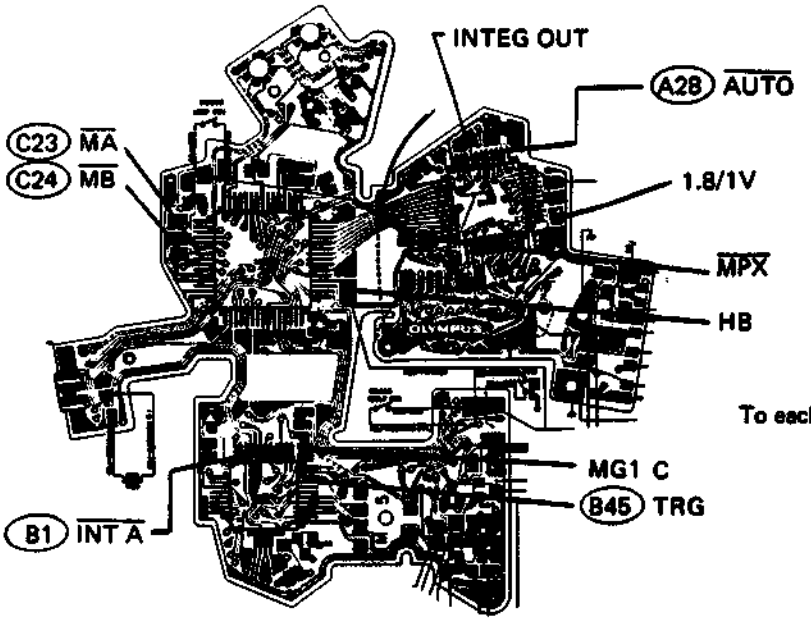
(H12) —→ (B3) - - <- M. COMP (Reversed output) - - -> Next

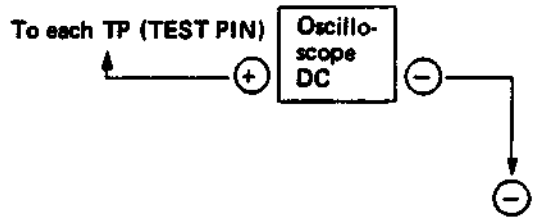
(6) The reversed output of the M. COMP. is divided into two, one for turning off the MG2 and the other for informing the CPU of completion of integration to charge the MG1.

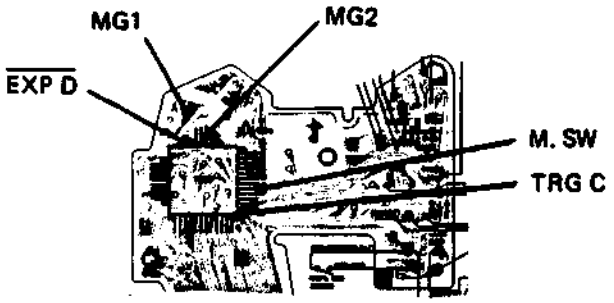
(Reversed output) ---- B37 — L → MG2 OFF

---- B12 $\overline{MPX}$ — L → C33 → C23 $\overline{MA}$ — H → B15

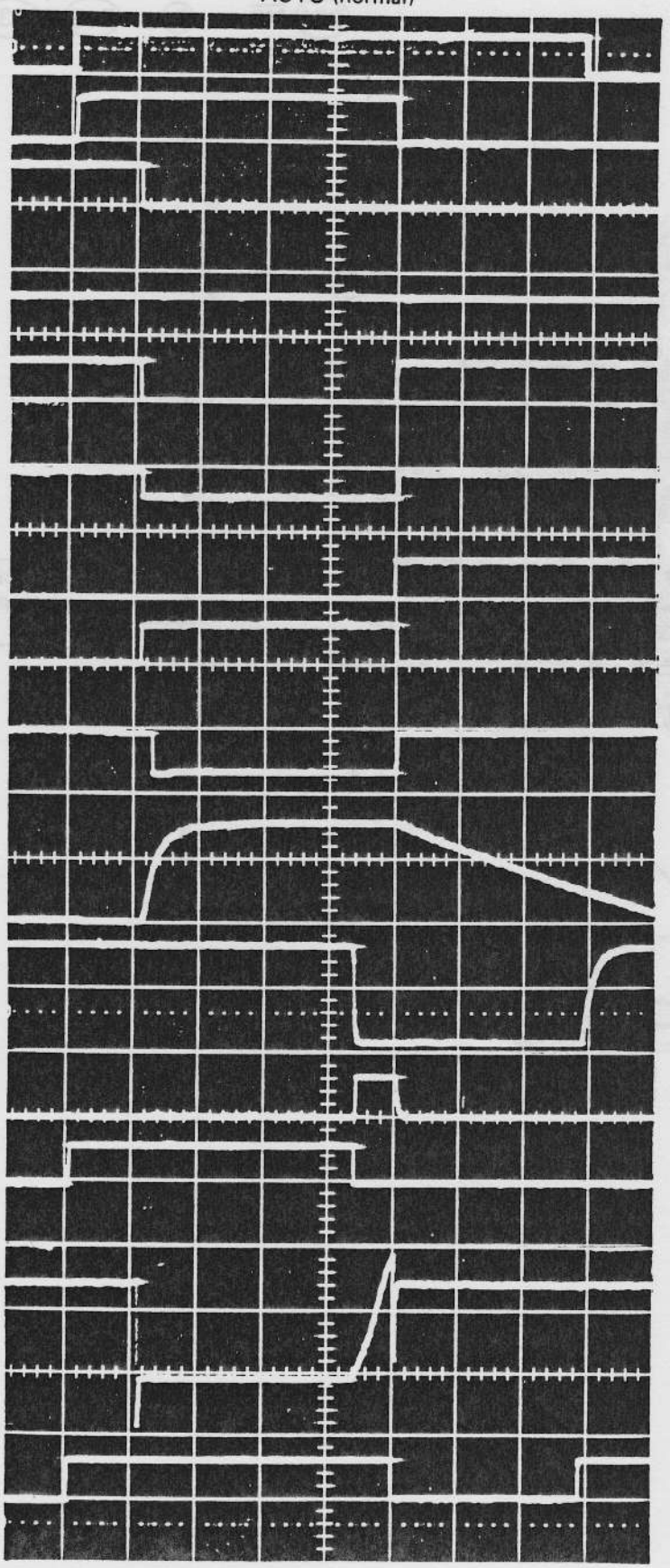
C24 $\overline{MB}$ — L → B16 → B3 — L → C501





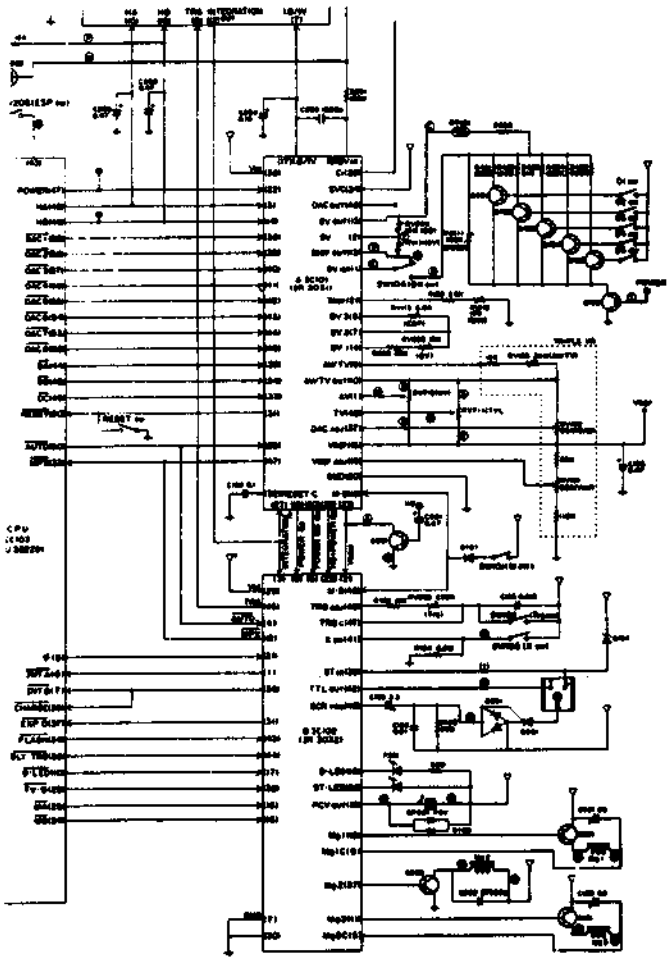


AUTO (normal)

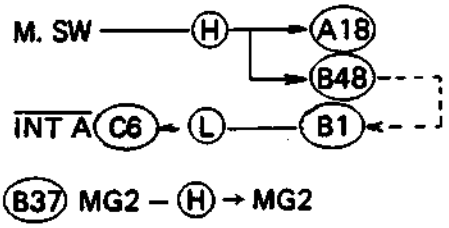


M. SW	0.5V	20mS
MG2	0.1V	20mS
(C50) $\overline{\text{AUTO}}$	0.5V	20mS
HA	0.5V	20mS
HB	0.5V	20mS
1.8/1V	0.2V	20mS
(B15) $\overline{\text{MA}}$	0.1V	20mS
(B16) $\overline{\text{MB}}$	0.1V	20mS
MG1	0.1V	20mS
MG1 C	0.2V	20mS
TRG C	0.2V	20mS
(B45) TRG	0.2V	20mS
$\overline{\text{EXP D}}$	0.5V	20mS
INTEG. OUT	50mV	20mS
$\overline{\text{MPX}}$	0.5V	20mS

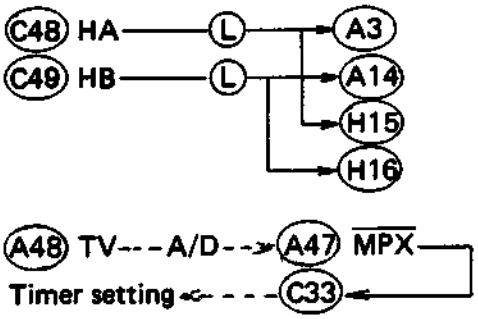
15. Manual Time Circuit



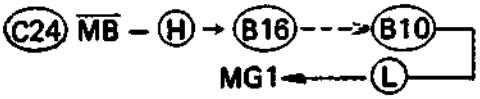
(1) This circuit informs each IC that the M. SW has been turned on.



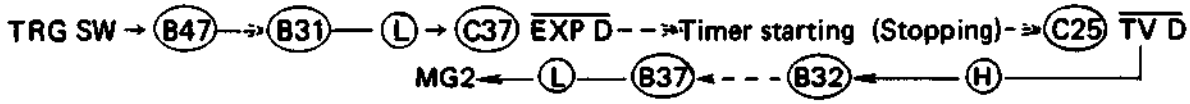
(2) The circuit selects recovery time mode, reads the TV value, and set the timer in the CPU.



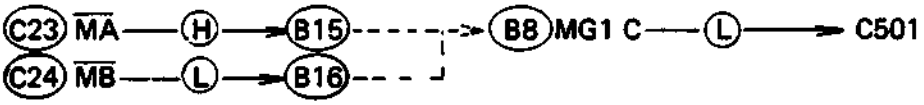
(3) MG1 is turned on.

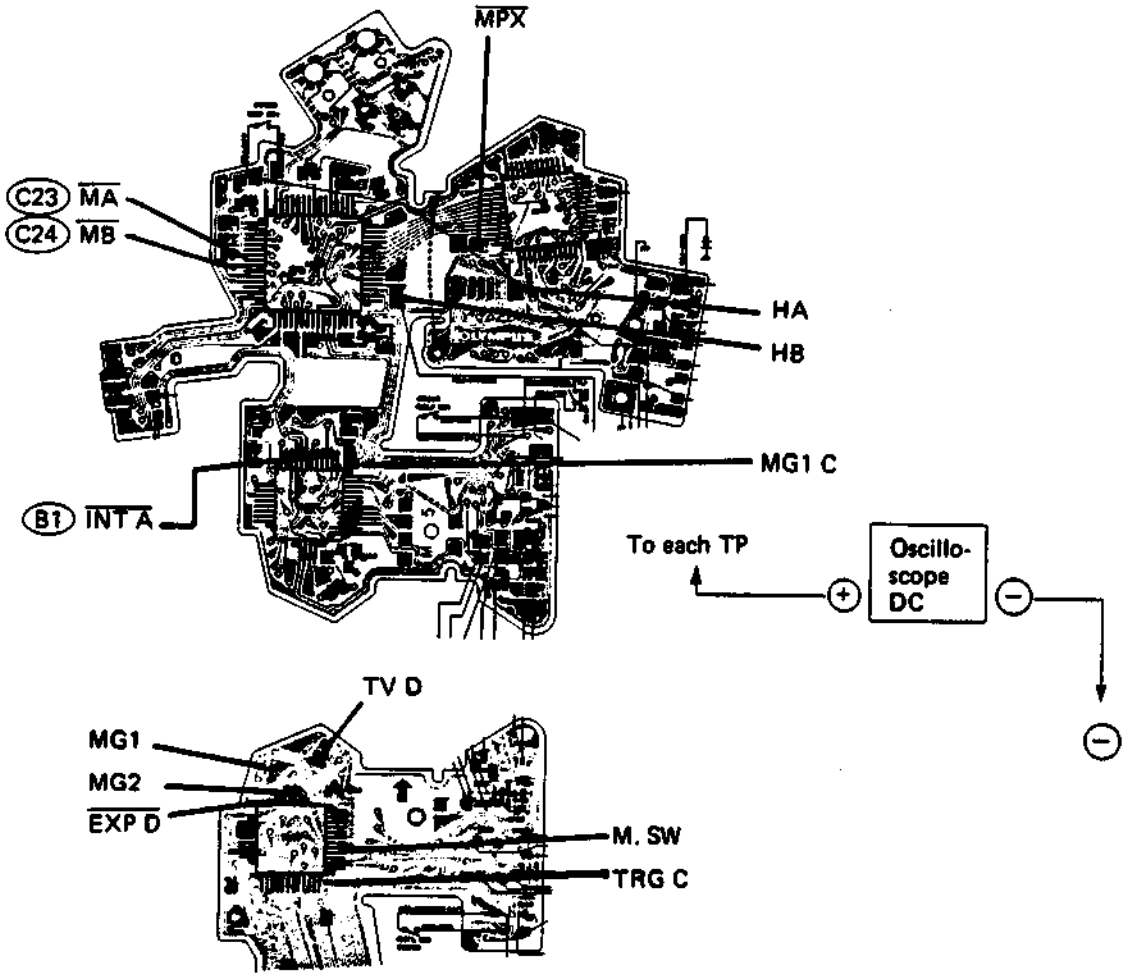


(4) The circuit informs the CPU that the TRG is turned off, and it starts the timer. After the preset time has passed, the circuit turns off the MG2.



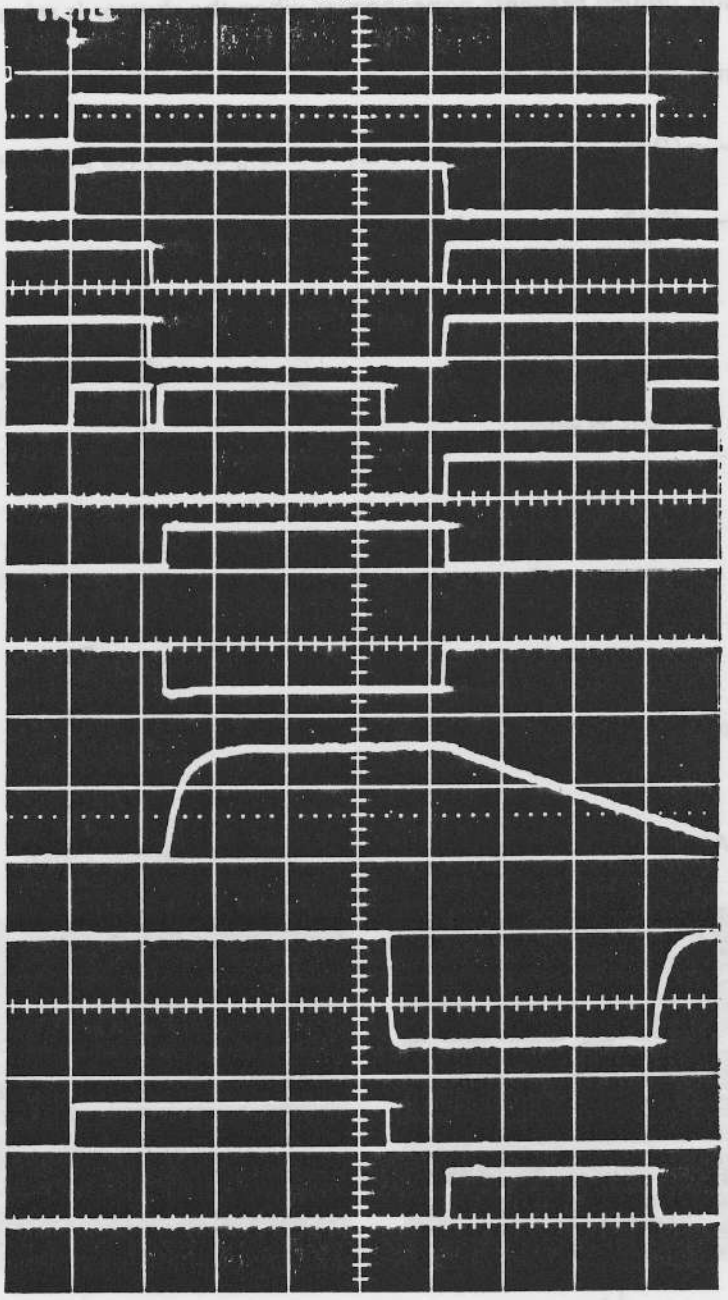
(5) It completes operation by charging the C501 of the MG1.




MPX
C23 MA
C24 MB
HA
HB
MG1 C
B1 INT A
To each TP
Oscillo-
scope
DC
TV D
MG1
MG2
EXP D
M. SW
TRG C

MANUAL

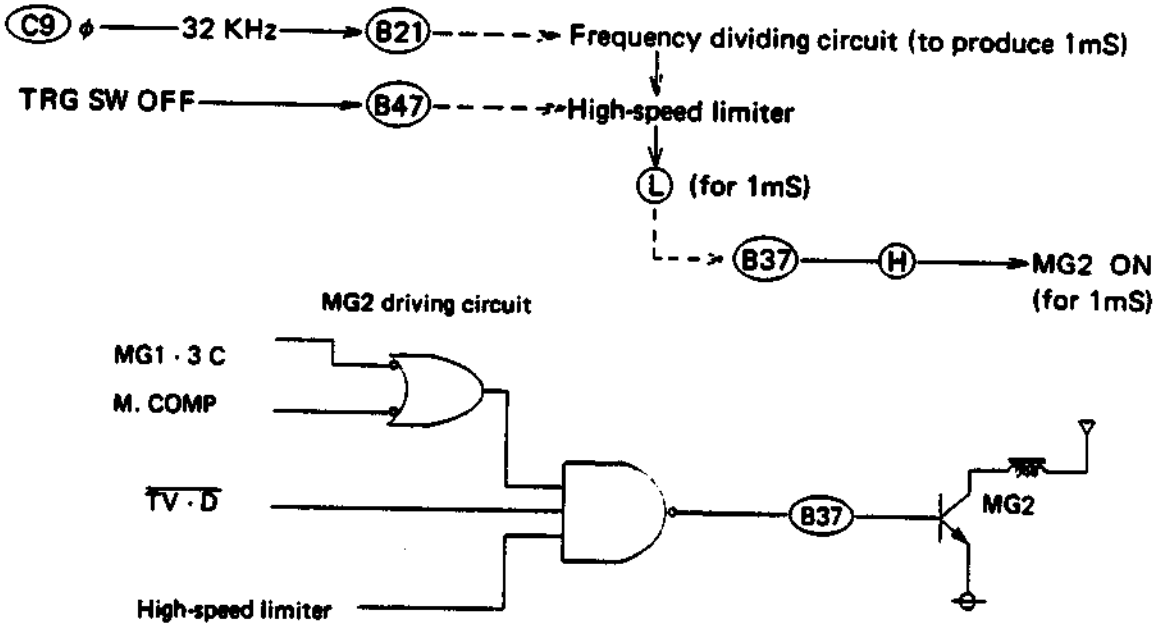
Shutter time

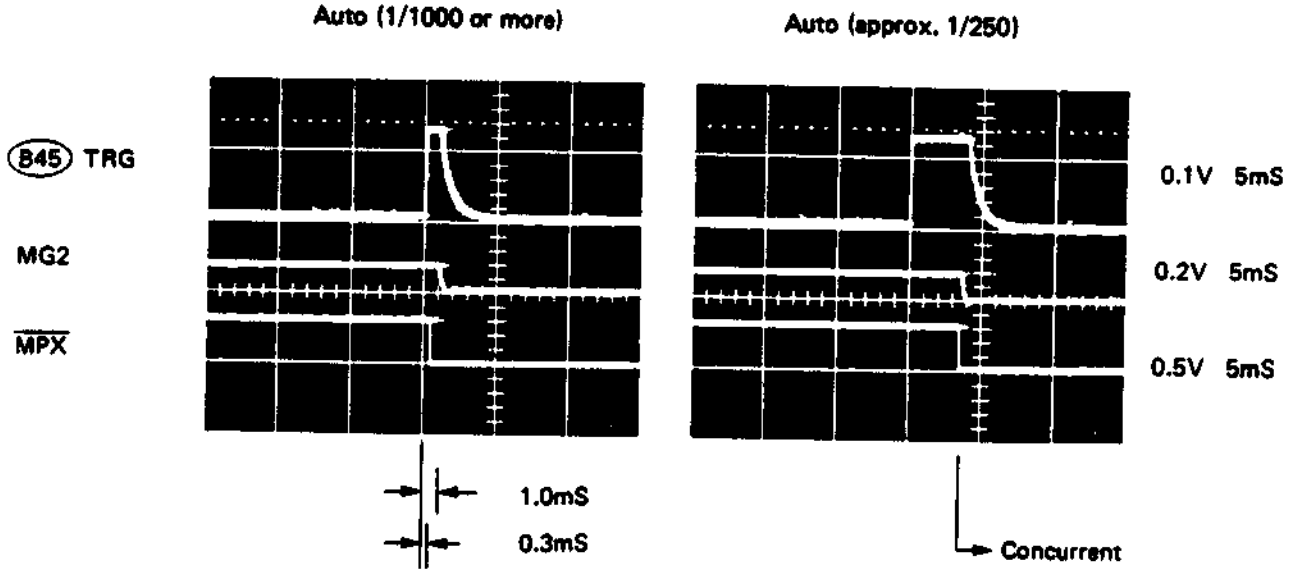


M. SW	0.5V	20mS
MG2	0.1V	20mS
HA	0.5V	20mS
HB	0.5V	20mS
$\overline{\text{MPX}}$	0.5V	20mS
MA	0.1V	20mS
MB	0.1V	20mS
MG1	0.1V	20mS
MG1 C	0.2V	20mS
TRG C	0.2V	20mS
$\overline{\text{EXP D}}$	0.5V	20mS
$\overline{\text{TV D}}$	0.1V	20mS

16. **High-speed Limiter Circuit (which prevents nonexposure when the shutter is released at high speed)**

- It functions in the auto and program modes.



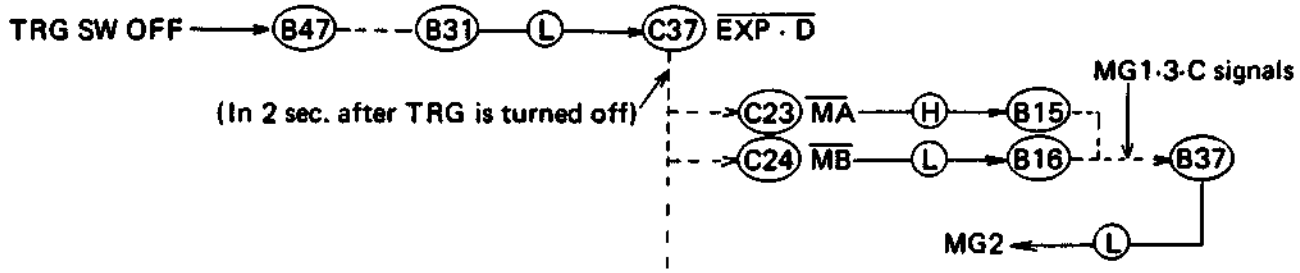


- The M. COMP is reversed in 0.3mS after TRG off, but the MG2 is not turned off until 1mS passes.

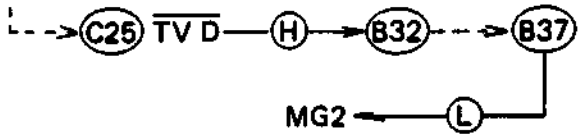
17. **Long-time Limiter Circuit (closes the second shutter blind at the longest 2 seconds in low-speed operation)**

- This circuit functions in the auto and program modes.

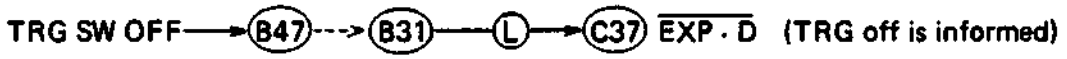
(1) ESP OFF
For correcting the ESP ⊖



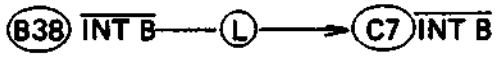
(2) For correcting the ESP ⊕



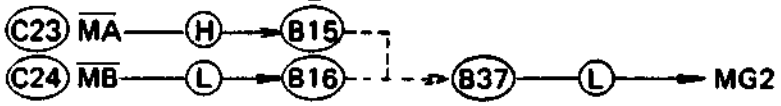
(3) When a flash is employed



(After flashing is effected and the current supply is stopped to the L terminal)

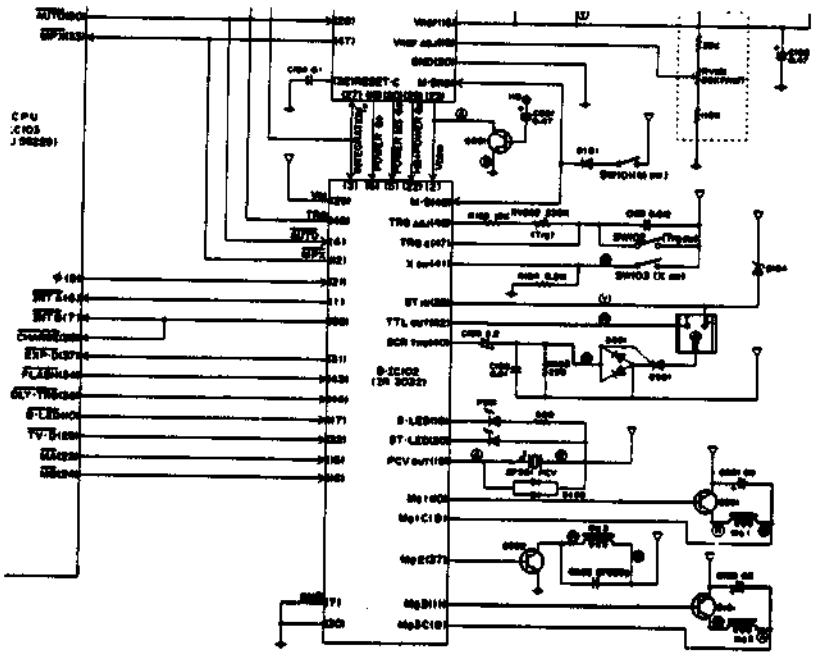


Unless $\overline{\text{INT B}}$ is set to (L) within 2 seconds after the TRG is turned off,



18. Flashing Circuit

A. Flashing control circuit



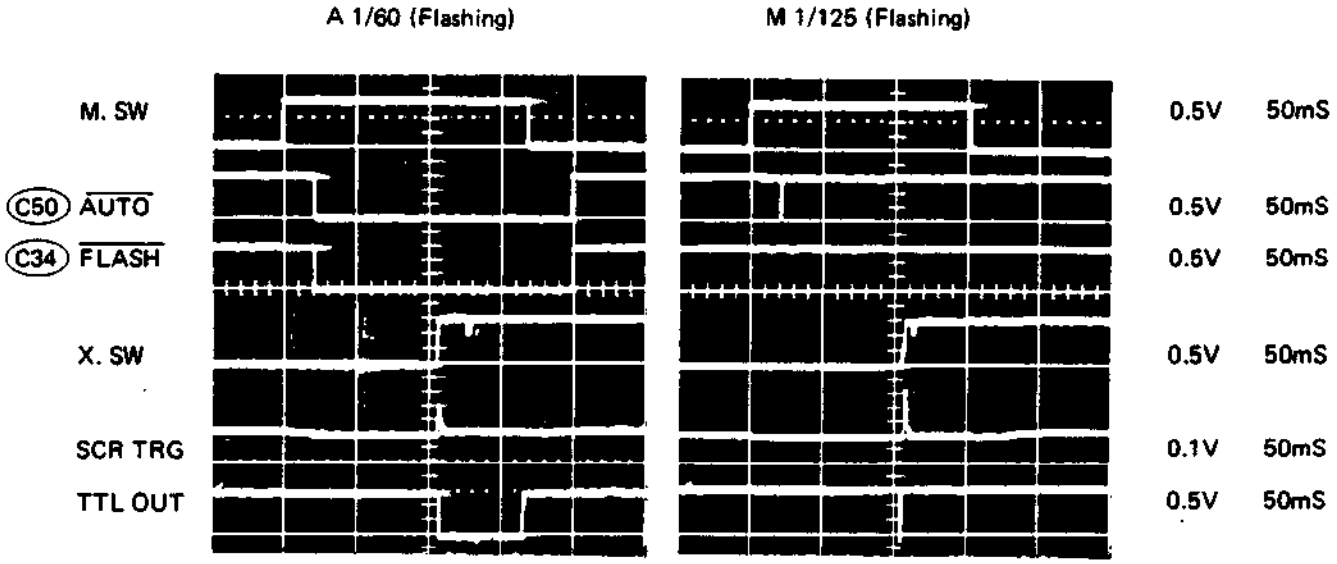
(1) When the T-flash power switch is turned on, the current of about 10 μA flows in the following order:
T-flash ⊖ contact → camera body ···→ current discriminating circuit ···→ (B39) ST IN → L terminal.

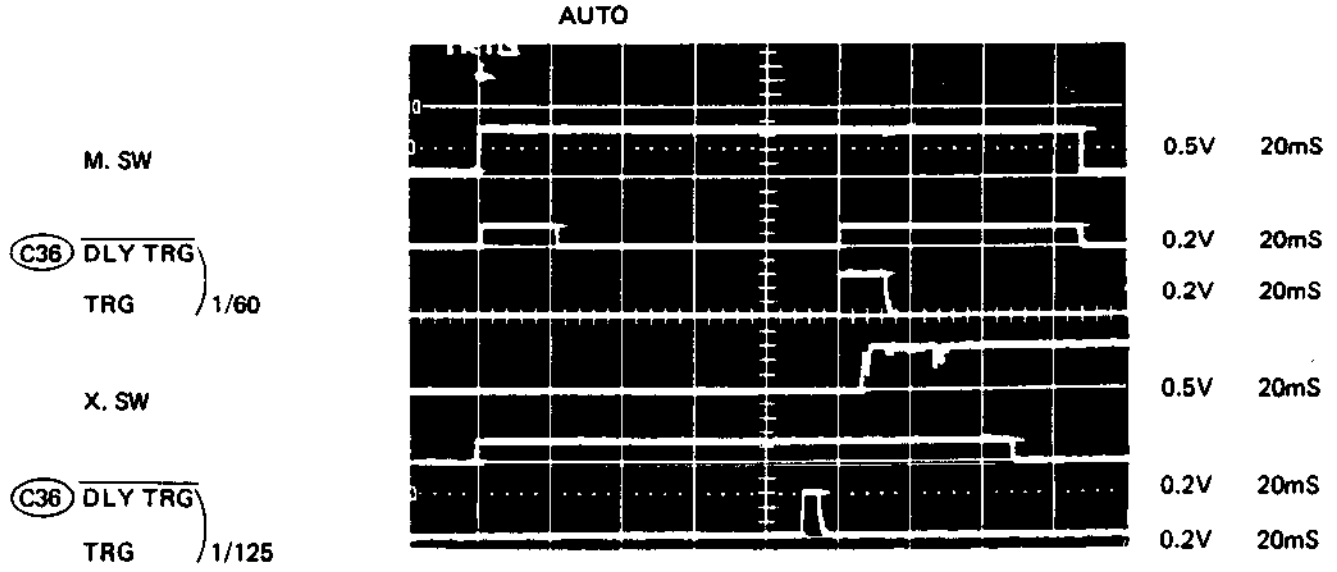
(2) (B38) —— (H) → (C35) $\overline{\text{CHARGE}}$ (When this circuit informs the CPU that a flash is mounted, the CPU selects the flash mode.)

- The CPU determines whether or not the flash should fire, depending on presence or absence of power supplied to the L terminal.
  a. No power (except T-flash)
     Always causes the flash to fire. ($\overline{\text{FLASH}}$ (H))
  b. Power supplied (T-flash)
     Flashing is controlled by $\overline{\text{AUTO}}$ and $\overline{\text{FLASH}}$ signals.
     * Manual ..... always fire ($\overline{\text{FLASH}}$ (H))
     * Auto and program ..... fire at 1/60 or less ($\overline{\text{FLASH}}$ (L))

(3) When charging is continued to allow the L terminal current to reach or exceed 100 μA,
Flash LED driving circuit ON (B20) ST.LED —— (L) → ⚡ LED comes on

(4) (C36) $\overline{\text{DLY TRG}}$ —— (L) → (B44) (H.A. does not start integration as long as the $\overline{\text{DLY TRG}}$ is set to (L)).


A 1/60 (Flashing)
M 1/125 (Flashing)
M. SW
C50 AUTO
C34 FLASH
X. SW
SCR TRG
TTL OUT
0.5V 50mS
0.5V 50mS
0.5V 50mS
0.5V 50mS
0.1V 50mS
0.5V 50mS


AUTO
M. SW
C36 DLY TRG
TRG
1/60
X. SW
C36 DLY TRG
TRG
1/125
0.5V 20mS
0.2V 20mS
0.2V 20mS
0.5V 20mS
0.2V 20mS
0.2V 20mS

B. Flashing circuit

(5) In 12mS after the TRG SW is turned off;

(C36) $\overline{\text{DLY TRG}}$ —— (H) ——▶ (B44) - - -▷ (B45) TRG —— (H) ——▶ (H8) (Informs that integration has started)

(6) X SW ON —— (H) ——▶ (B41) X. SW - - -▷ (B40) SCR TRG —— (H) ——▶ SCR ON (Flashing)

- The C105 discharges in the following manner:

C105 (+) ——▶ Q301-G ——▶ Q301-K ——▶ Body ——▶ X. SW ——▶ (B41) ——▶ (B40) ——▶ C105 (−)

(7) The L terminal current supply is suspended as soon as the flash fires,

(B38) —— (L) ——▶ (C7) $\overline{\text{INT B}}$ (Informs that flashing has been effected)

C. Light-controlling circuit

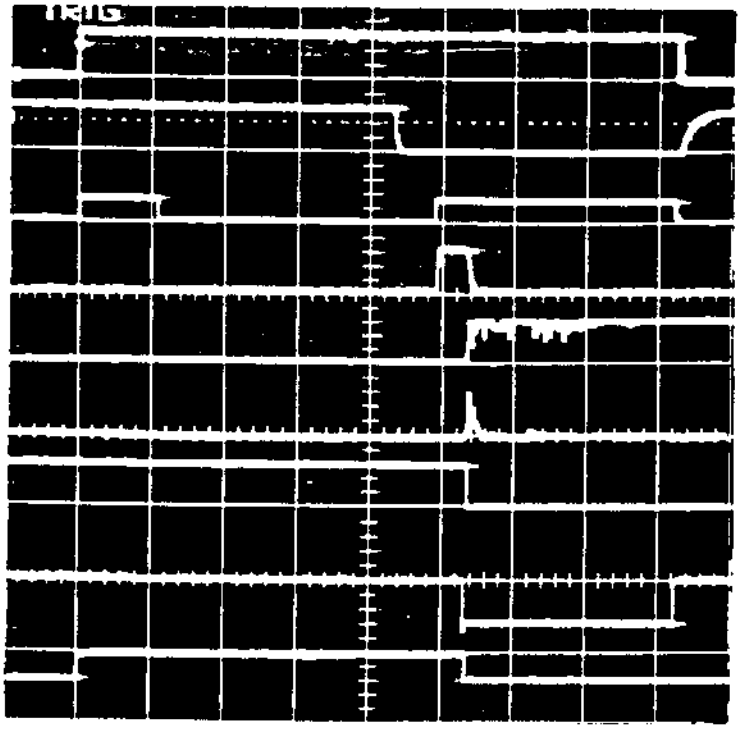
(8) The head amplifier charges the C202 through photoelectric conversion and outputs integration values.

(H12) INTEG. OUT ——▶ (B3) - - -▷ M. COMP (Reversed) - - -▷ (B42) TTL OUT —— (L) ——▶ TTL terminal (flashing stopped)

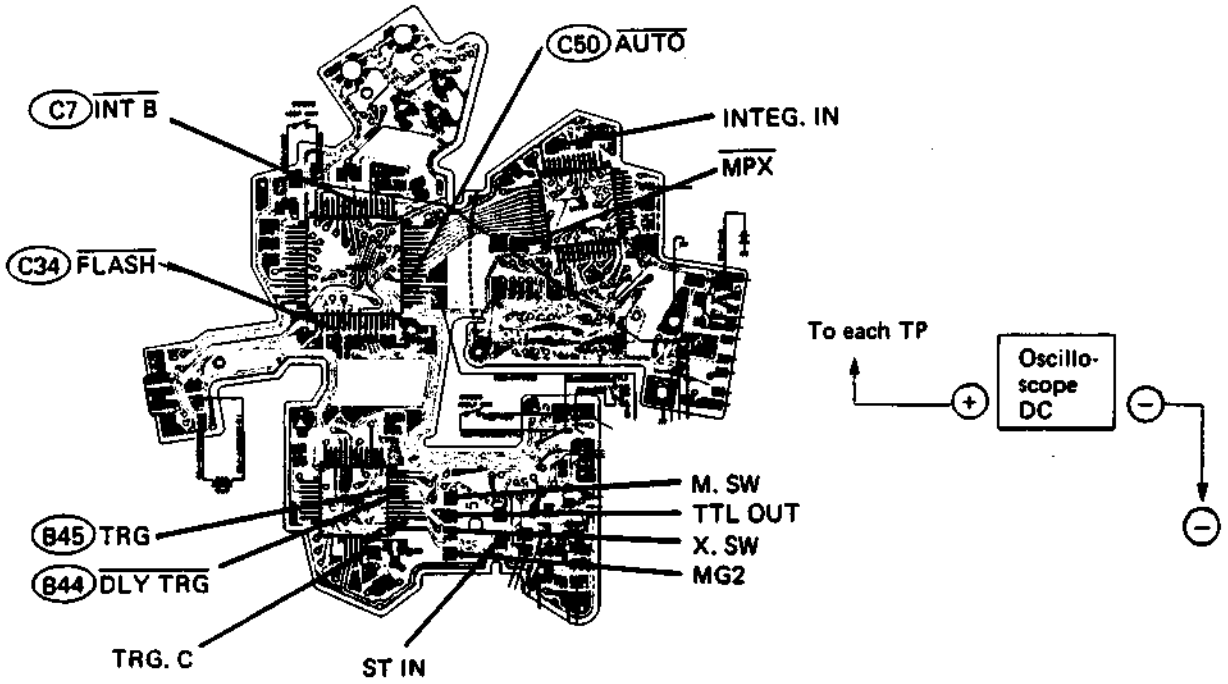
MG1, 3 · C ◀—— (B12) $\overline{\text{MPX}}$ ◁- - - - - - - - - - ▷ (B37) —— (L) ——▶ MG2 OFF

(B39) ST IN - - -▷ (B20) ST LED —— (H ⇔ L) ——▶ LED blinking

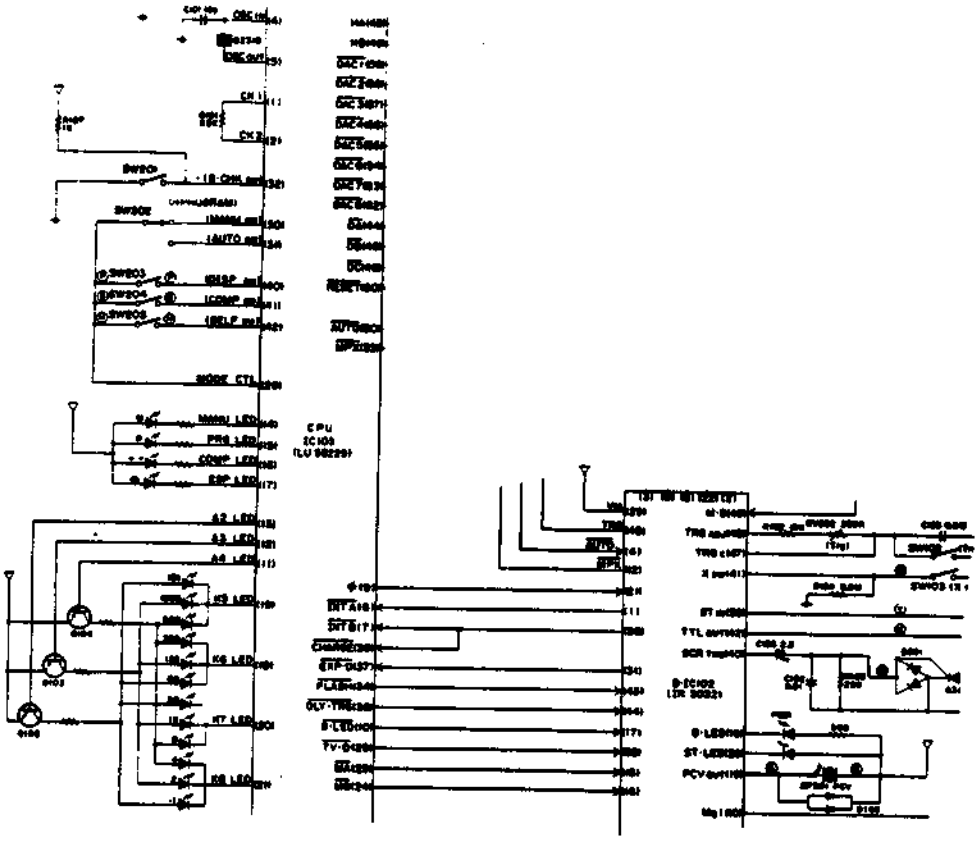
AUTO (T-flash ON)



M. SW	0.5V	20mS
TRG. C	0.5V	20mS
(B44) $\overline{\text{DLY TRG}}$	0.2V	20mS
(B45) TRG	0.2V	20mS
X. SW	0.5V	20mS
SCR TRG	0.1V	20mS
(C7) $\overline{\text{INT B}}$	0.5V	20mS
TTL OUT	0.5V	20mS
MG2	0.2V	20mS


C50 AUTO
C7 INT B
INTEG. IN
MPX
C34 FLASH
To each TP
Oscillo-scope DC
M. SW
TTL OUT
X. SW
MG2
B45 TRG
B44 DLY TRG
TRG. C
ST IN

19. B.C. Circuit



(1) B.C. SW ON—(L)→(C32)

By setting (C14), (C15), (C16), and (C17) to (L), M, P, +−, and ▣ are lit on (since the battery is loaded).

(2) (C9) ϕ—32KHz→(B21)→Frequency diving circuit divides into 2 kHz- - - - -PCV driving circuit

(3) 2.7V or more

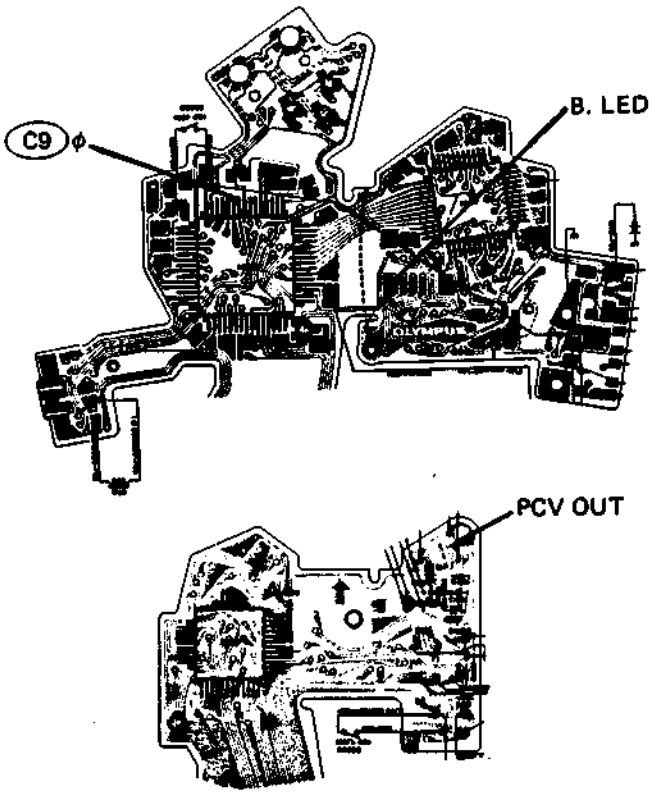
(C10) B.LED—(L)→(B17)→PCV driving circuit→(B19) PCV. OUT—2KHz→PCV produces continuous sounds

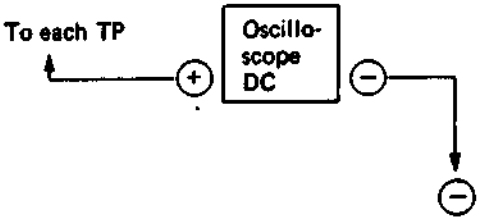
(B17)→LED driving circuit→(B18) B. LED—(L)→LED is lit on

2.65 ~ 2.70V (Warning)

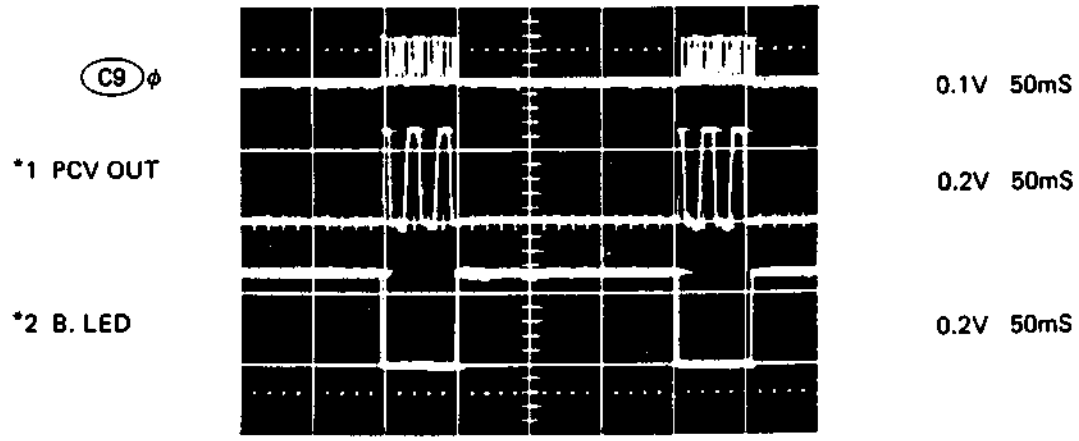
(C10) B.LED→(B17)→PCV driving circuit (B19) PCV. OUT —*1→ PCV produces intermittent sounds

(B17)→LED driving circuit (B18) B. LED —*2→ LED is blinking

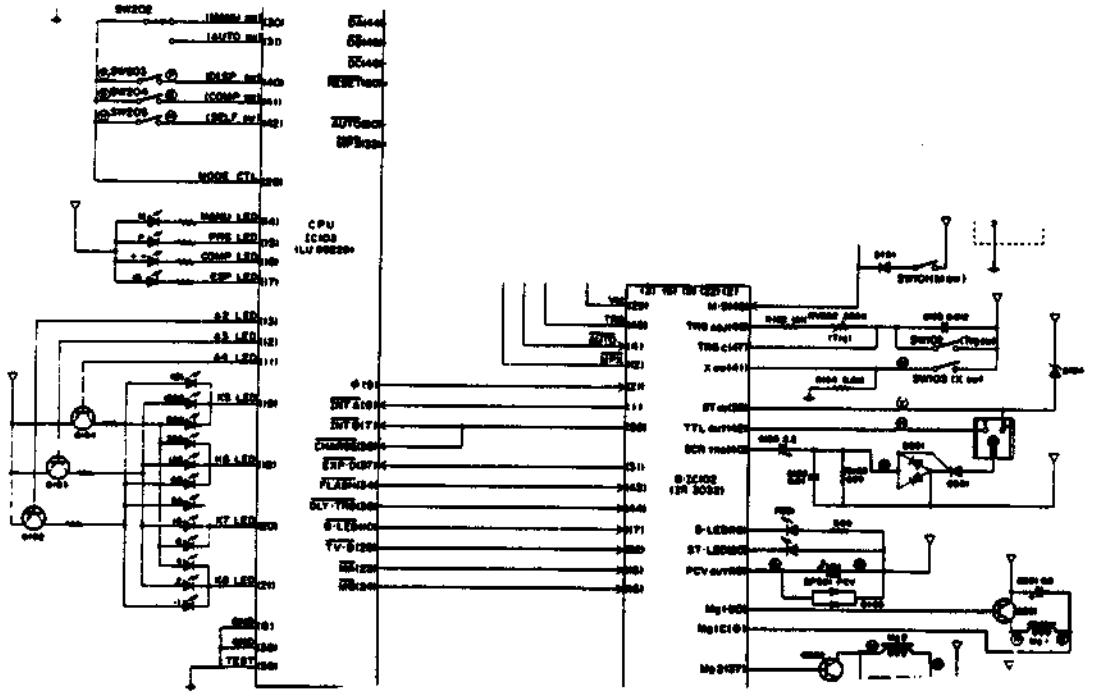




When B.C. is blinking



20. Self-timer Circuit



(1) SELF SW ON (C29) MODE CTL → (C42)

(2) M. SW ON — (H) → (A18) → (B48) → (B1) — (L) → (C6) $\overline{\text{INT A}}$

(3) The MG1 is protected from being turned on for 12 seconds after the M. SW is turned on.

(C24) $\overline{\text{MB}}$ — (12S (L)) → (B16) - - → (B10) MG1 — (H) → MG1

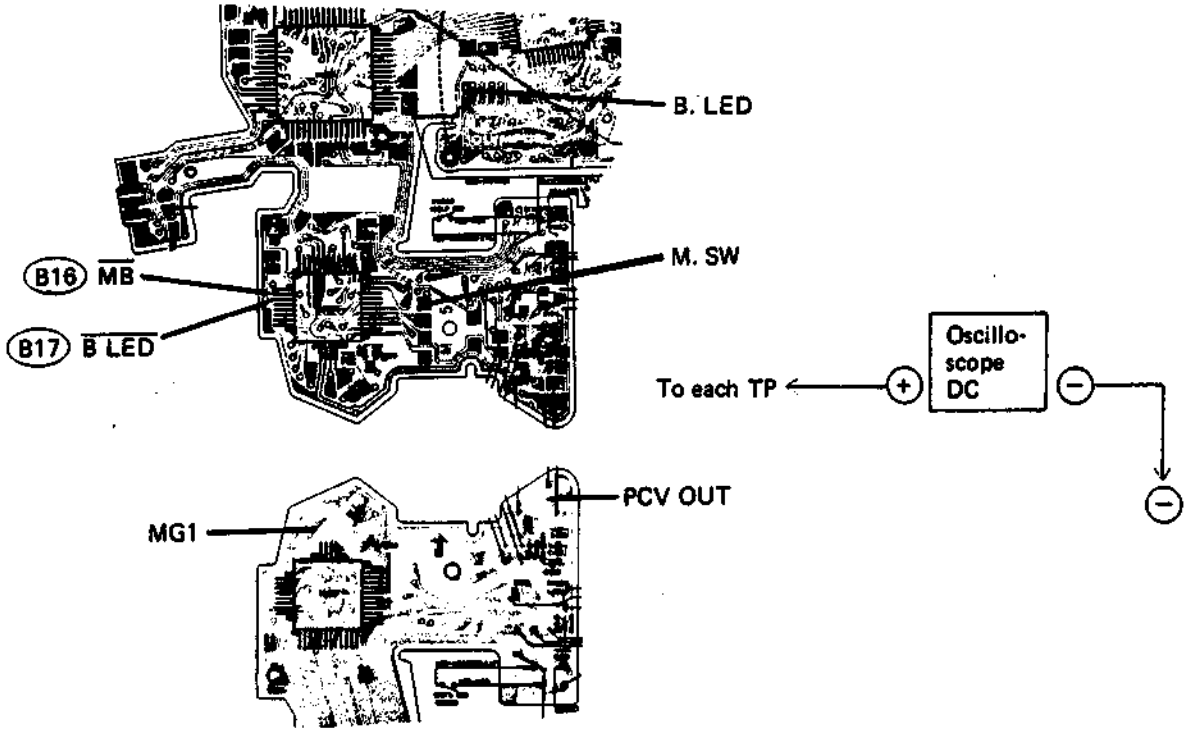
(4) (C9) ϕ — 32KHz → (B12) - - → Frequency dividing circuit divides into 2 kHz - - → PCV driving circuit

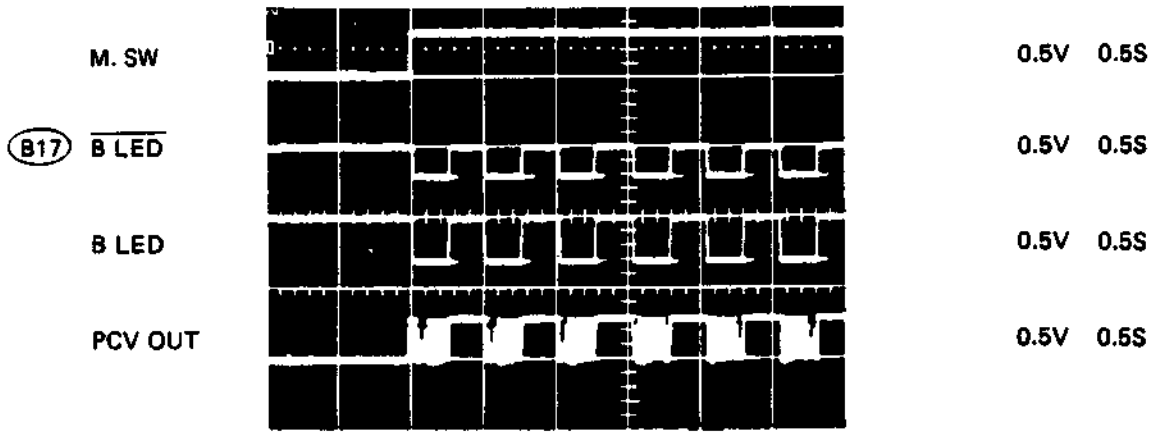
(C10) $\overline{\text{B. LED}}$ — 2Hz → (B17) → PCV driving circuit → (B19) PCV OUT → PCV produces intermittent sounds

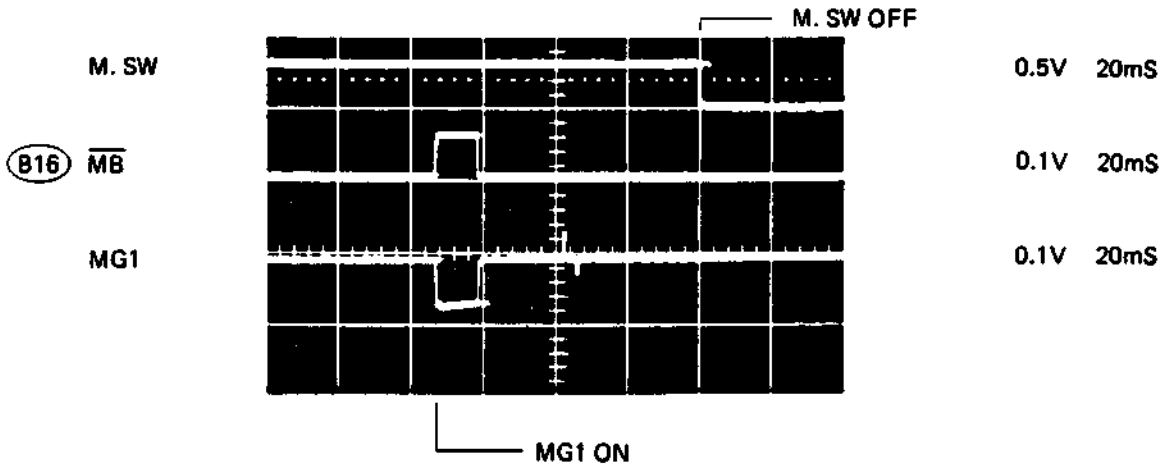
→ LED driving circuit → (B18) B. LED → LED is blinking

(5) In 12 seconds after the M. SW is turned on;

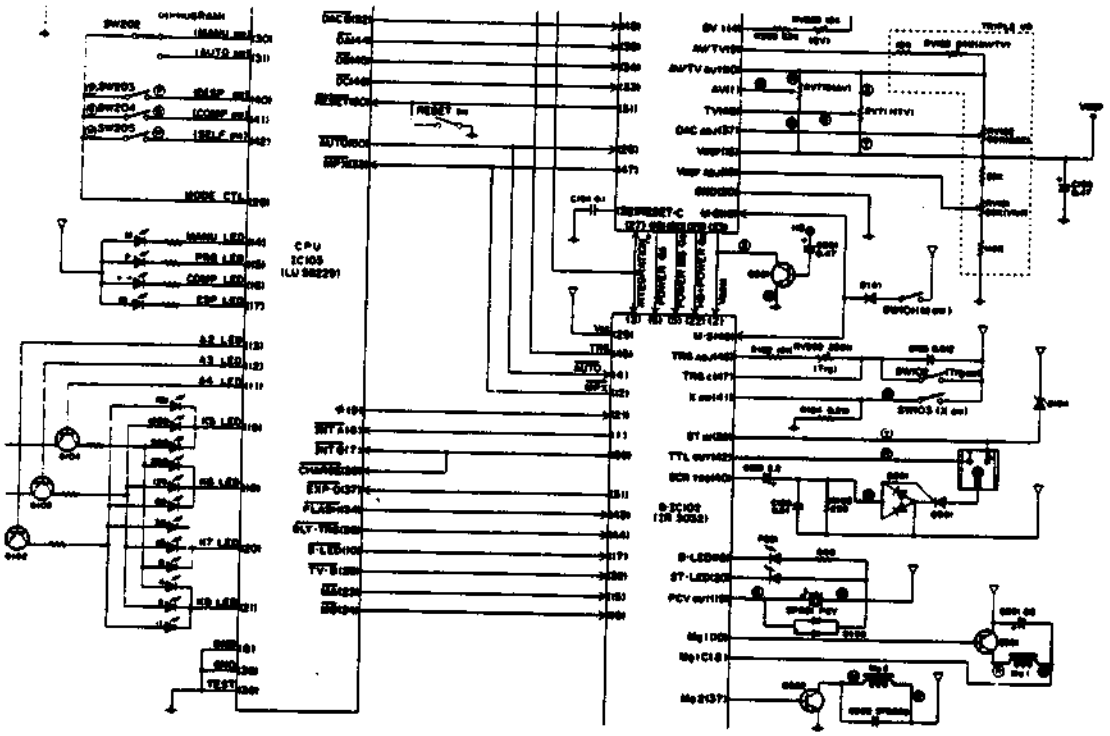
(C24) $\overline{\text{MB}}$ — (H) → (B16) - - → (B10) MG1 — (L) → MG1 ON


B. LED
M. SW
B16 MB
B17 B LED
Oscillo-scope DC
To each TP
PCV OUT
MG1


M. SW
B17 B LED
B LED
PCV OUT
0.5V 0.5S
0.5V 0.5S
0.5V 0.5S
0.5V 0.5S


M. SW OFF
M. SW
B16 MB
MG1
0.5V 20mS
0.1V 20mS
0.1V 20mS
MG1 ON

21. Bulb Circuit



(1) Set the S.D. to B in the manual mode (the indication disappears).

(C29) MODE CTL ——→ (C30)

(2) M. SWON ——(H)——→ (A18) / (B48) ---→ (B1) ——(L)——→ (C6) $\overline{\text{INT A}}$

(3) (C25) $\overline{\text{TV D}}$ ——(L)——→ (B32) - - -→ (B37) MG2 ——(H)——→ MG2 ON

(4) Aperture starts to stop down —— (C24) $\overline{\text{MB}}$ ——(H)——→ (B16) → (B10) MG1 ——(L)——→ MG1 ON

(5) Stop down is completed ——→ Mirror comes up ——→ First shutter blind starts moving

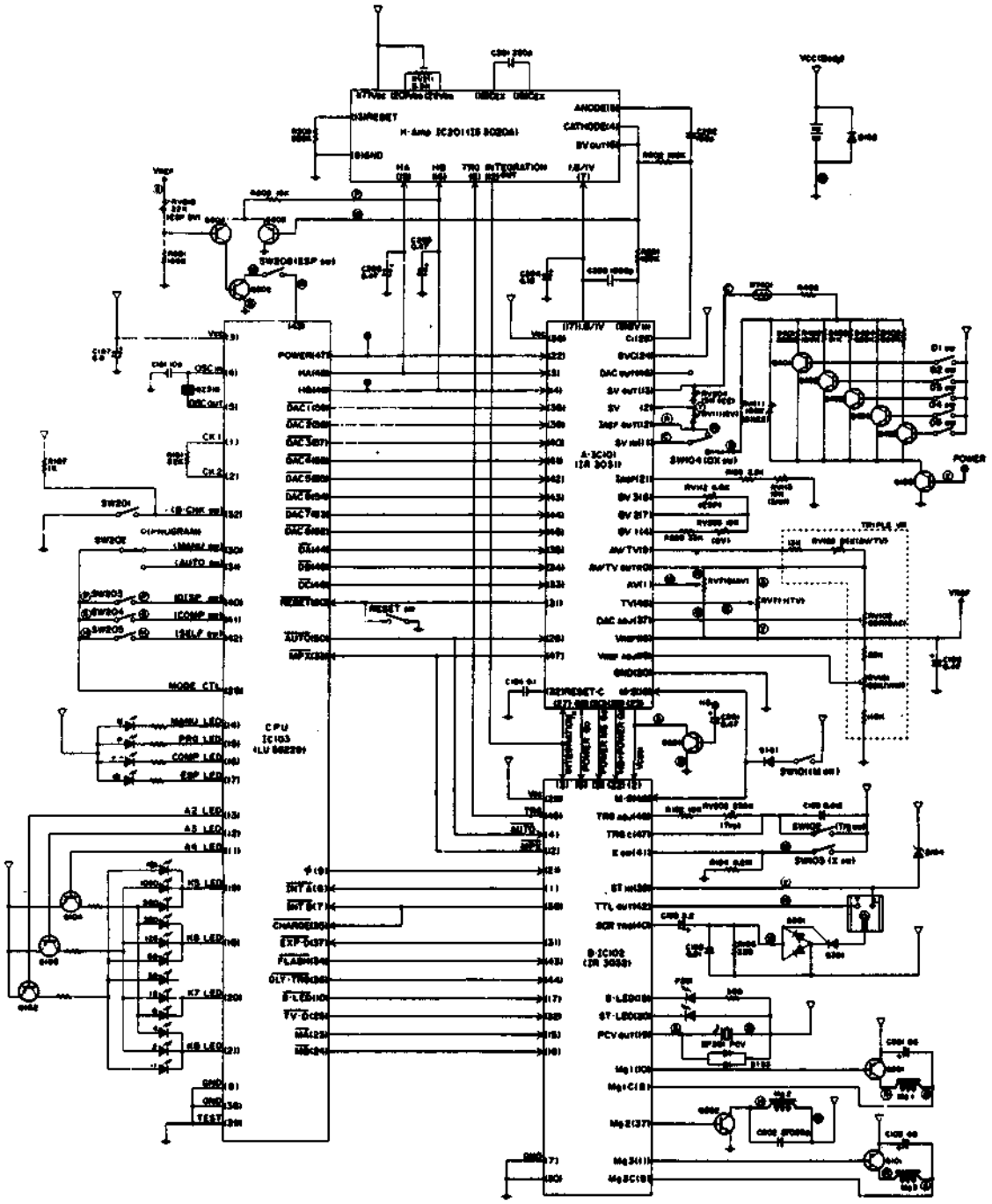
(6) The CPU checks on or off of the DISP SW at every 100 mS.

In case the DISP SW is ON (C25) $\overline{\text{TV D}}$ —Keep to (L)→ (B32) → (B37) MG2 ——(H)——→ MG2 ON

In case the DISP SW is OFF —(C25) $\overline{\text{TV D}}$ ——(H)——→ (B32) → (B37) MG2 ——(L)——→ MG2 OFF

(7) MG2 OFF ——→ Second shutter blind moves ——→ Exposure completed

22. ESP Metering Circuit



- Since ESP compensation is determined during indication, no compensation may be effected if the.shutter is released immediately after the indication disappears.
- No compensation is effected at BV8.5 or less, even if the ESP SW is turned on.

(1) DISP sw ON (display is started)

(2) ESP sw ON —— (L) ——→ C43 (however, it is turned on only at BV8.5 or more)

(3) C48 HA

(H L)

→ H15 - - - - →Photosensor selected- → H6 ——→ A5 BV IN

→ A3 - - - - →BV level shift circuit selected- - →A/D → A47 ——→ C33 $\overline{\text{MPX}}$

○ Data-reading order (TV), SV, AV, BV_B, BV_A (at every 70 mS)

(4) Compensation is calculated in accordance with a program previously selected.

⊕ compensation (+1 ~ +6EV)

(5) Compensation value is added to BV_B and the sum total is displayed by means of the LED.
- ○ A and M modes are compensated the time by full amount.
- ○ P mode is compensated both time and F value by half.

(6) H12 ——→ B3 - - →M. COMP (reversed)

C3 ←—— (L) ——B12 $\overline{\text{MPX}}$ ←- -

- - →C25 $\overline{\text{TV D}}$ ——(H)——

(Compensation value added)

B37 MG2 ←- - - - - -B32

(L)

→MG2 OFF

⊖ compensation (–0.6EV)

(5) Compensation value is subtracted from the BV_B and the result is displayed by the LED.
- ○ The full amount is used for compensate time.

(6) C44 $\overline{\text{DA}}$ ——(H)——→ A35

C45 $\overline{\text{DB}}$ ——(L)——→ A34 - - ┐

C46 $\overline{\text{DC}}$ ——(L)——→ A33 ┘

ON

H12 ——→ A27 - - → COMP determining –0.6EV

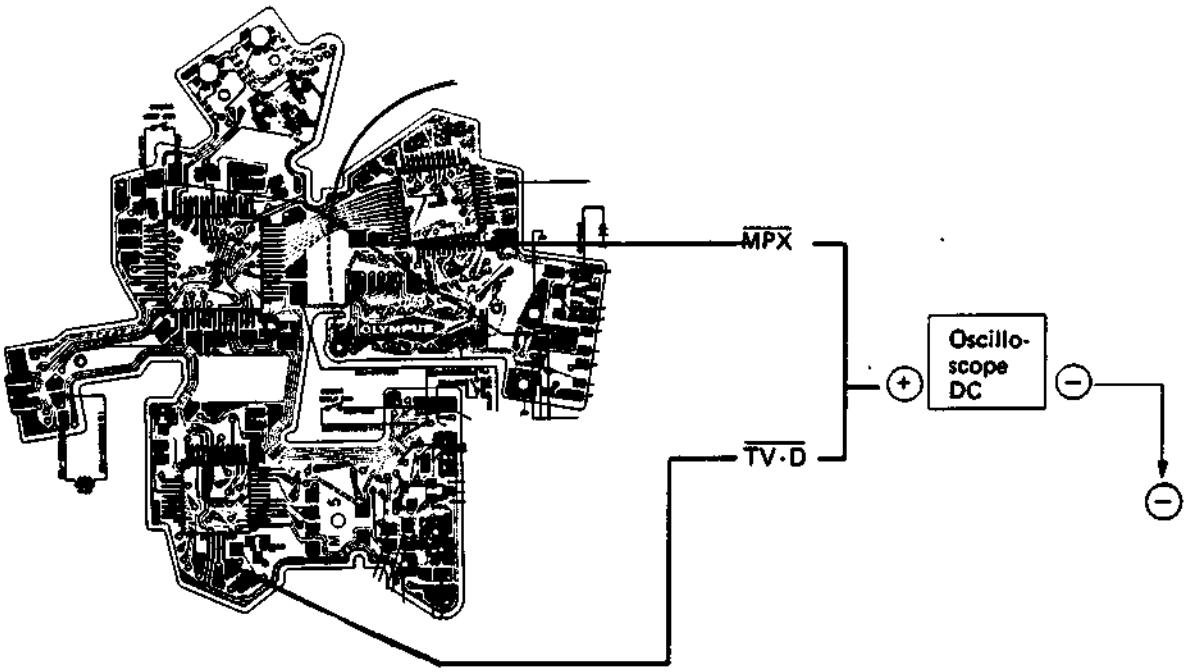
(reversed)

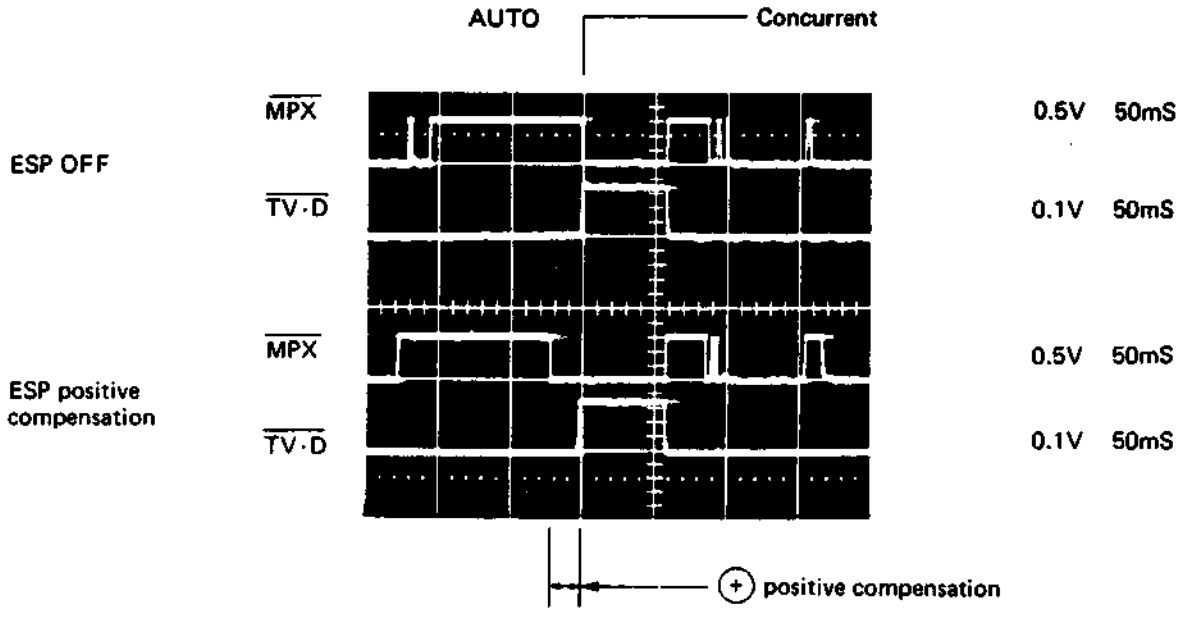
C33 ←——(L)—— A47 $\overline{\text{MPX}}$ ←- -

C23 $\overline{\text{MA}}$ ——(H)——→ B15 - - ┐

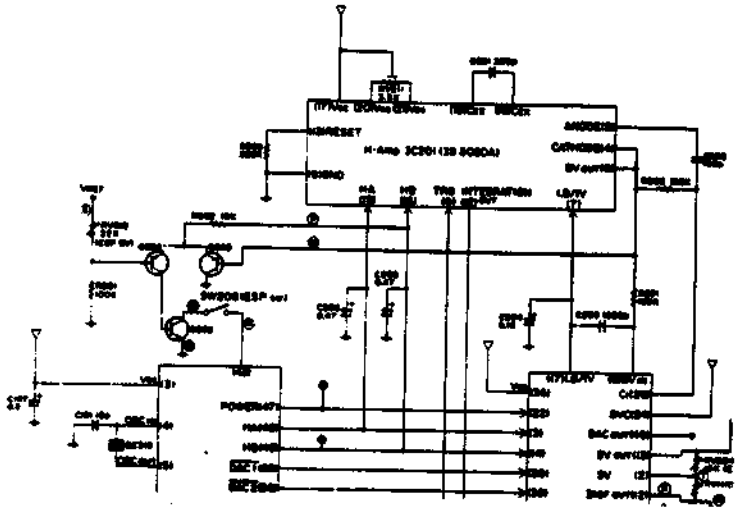
C24 $\overline{\text{MB}}$ ——(L)——→ B16 - - ┘→ B37 MG2

MG2 OFF ←——(L)——


MPX
TV·D
Oscillo-
scope
DC
+
−
−


AUTO
Concurrent
MPX
TV·D
MPX
TV·D
ESP OFF
ESP positive
compensation
0.5V 50mS
0.1V 50mS
0.5V 50mS
0.1V 50mS
+ positive compensation

23. ESP SW Circuit



Since the ESP metering is effected by alternating the pattern A (center) and the pattern B (average) of the photosensors of the head amplificer, output may not be stabilized immediately after photosensors are changed.

Response sensitivity becomes very low especially in low brightness. Since BV output is not decreased after the aperture starts stopped down, the device judges insufficiently stopped down, and allow the minimum aperture. The ESP SW circuit is incorporated to prevent such excessive stop down.

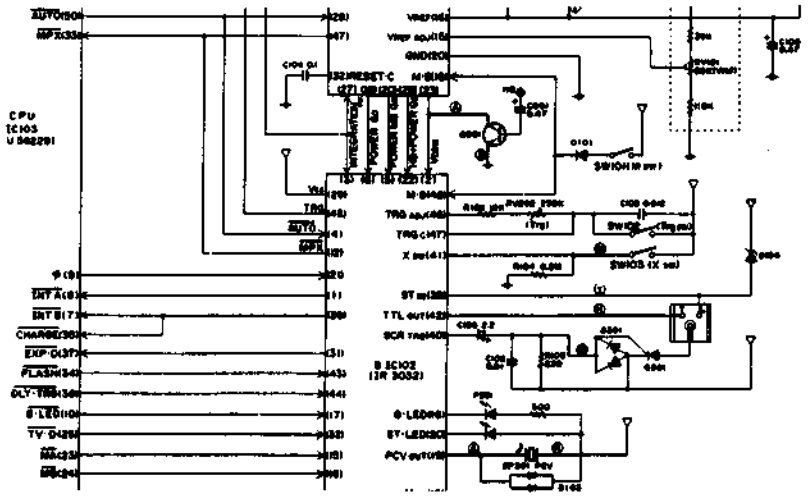
The phenomenon: "Aperture value goes to the minimum in low brightness during ESP metering in the program mode."

(1) The base of the Q804 should be equivalent to BV8.5 (this voltage should be adjusted by using the RV810).

(2) (H6) BV OUT ——— Q803-B

BV8.5 or more	Q803 OFF —— Q804 ON ———	ESP ON
BV8.5 or less	Q803 ON ——— Q804 OFF ———	ESP OFF

24. Full-power Flashing Preventive Circuit



The phenomenon: "full-power flashing is effected when effecting ESP positive compensation while using a TTL auto flash mode."

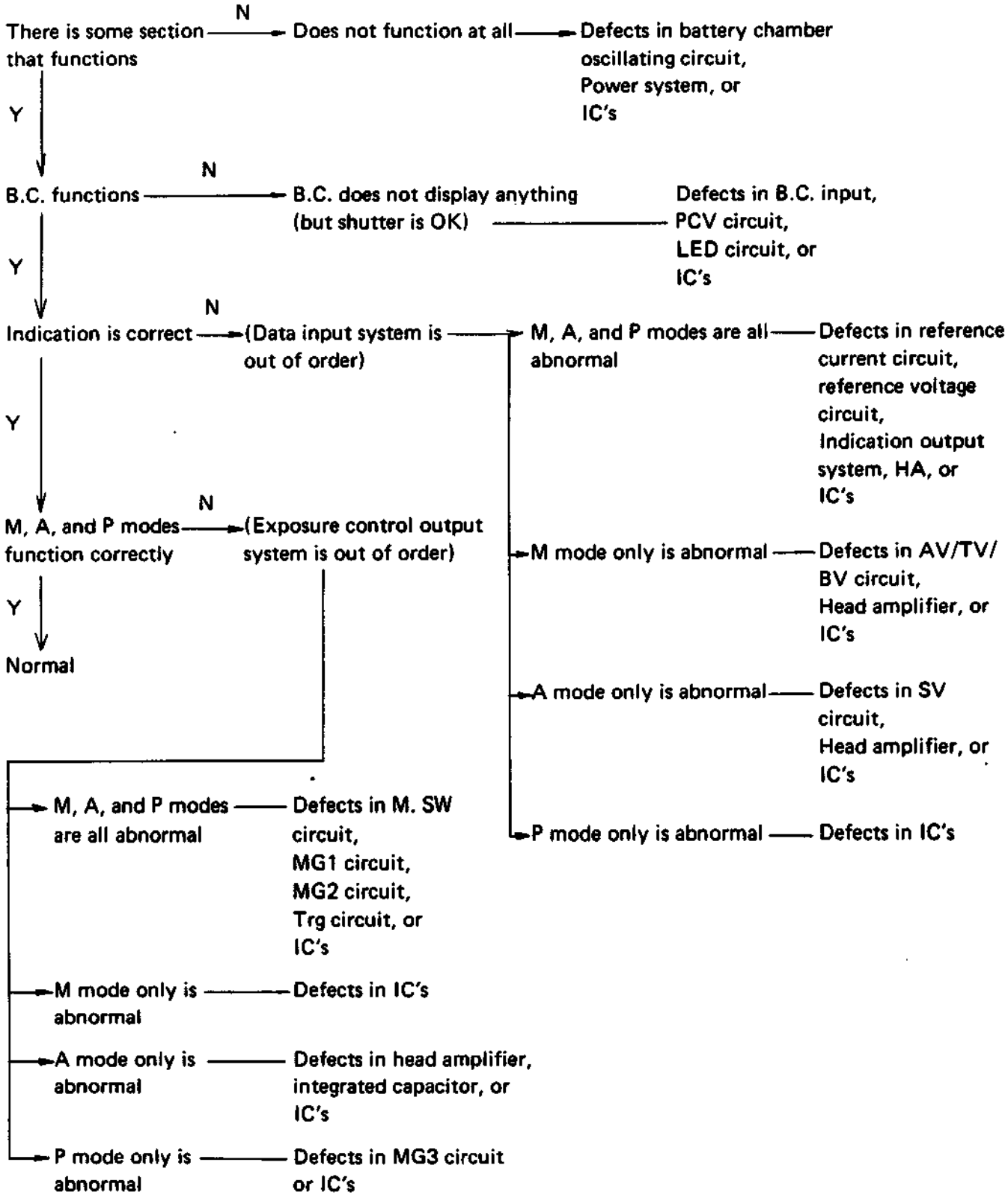
Should two-stage positive compensation be conducted, the shutter will be released at 1/250 even if the display indicates 1/60. So, the signal of TTL OUT is given prior to flashing. This means that the TTL OUT has already been set to Ⓗ when the flash fires, thereby full-power flashing being effected.

By forcibly reducing VCOM to Ⓛ by about 10mS using the HB Ⓗ which changes over the indicating mode, the TTL OUT is reset to Ⓛ, thereby small power flashing being attained.

IV. TROUBLESHOOTING OF ELECTRIC SYSTEM

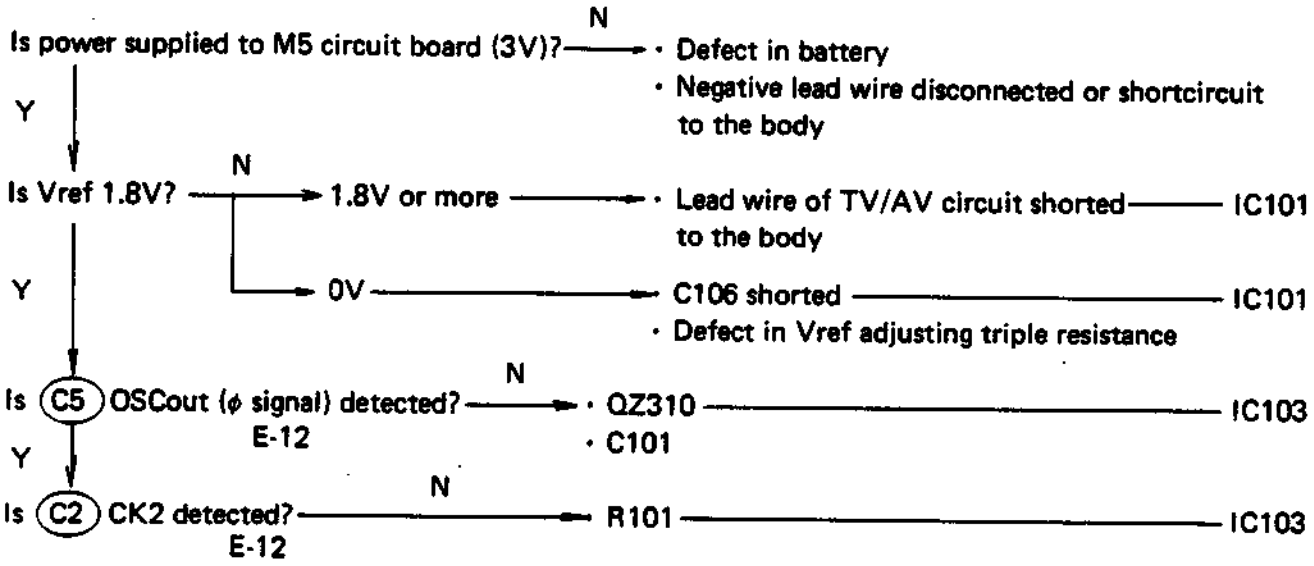
- The mechanism should operates properly.
- Check batteries in advance by using a tester.
- Check whether the indication is correct or not.
- Then, check operation in the manual (M), auto (A), and program (P) modes. (When repairing, correct the indication first and then correct the shutter.)
- Treat both the auto and the program modes as the same way except aperture control circuit.
- The numbers such as "E-34" indicate reference pages.

1. Diagnostic Flow Chart

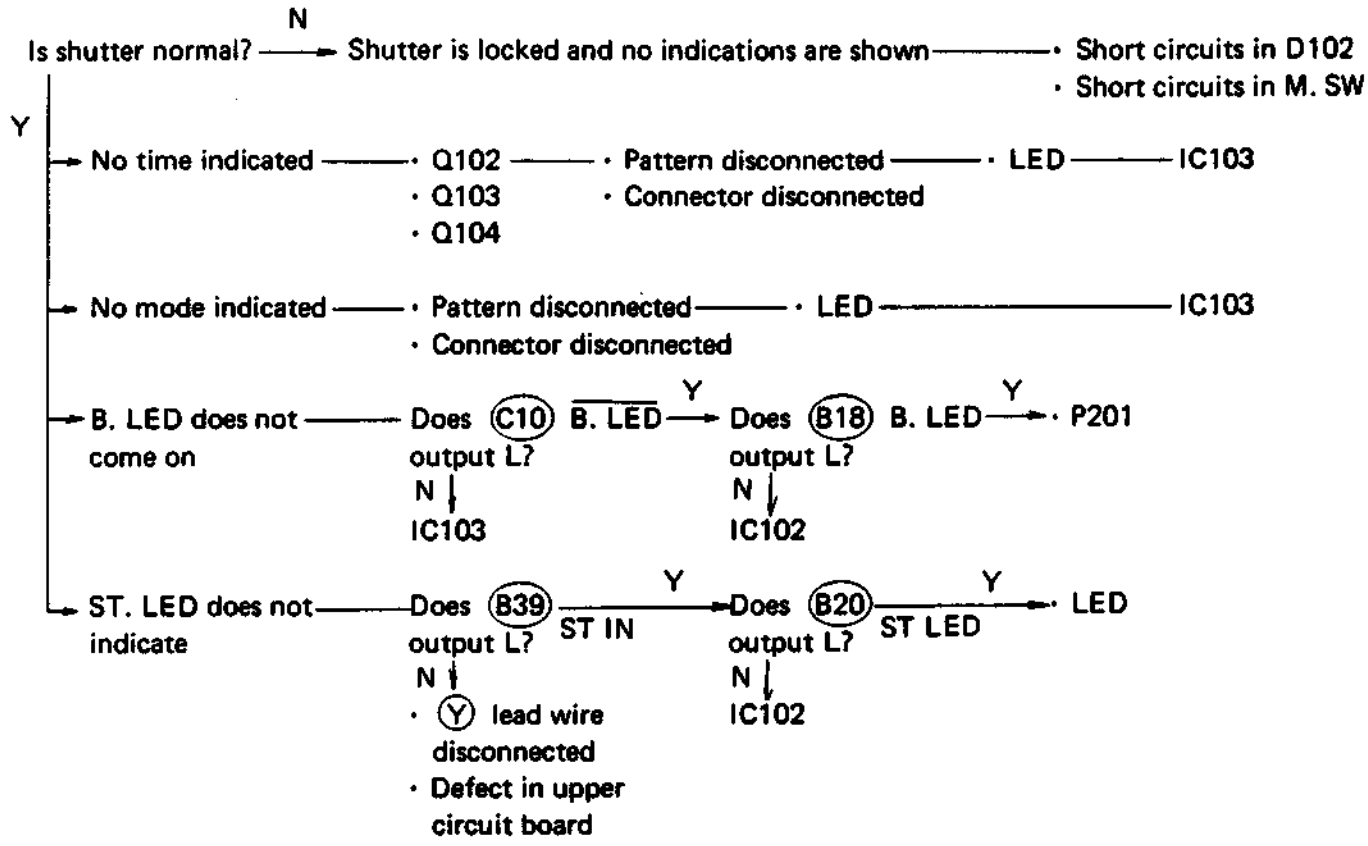

There is some section that functions
N
Does not function at all
Defects in battery chamber oscillating circuit, Power system, or IC's
Y
B.C. functions
N
B.C. does not display anything (but shutter is OK)
Defects in B.C. input, PCV circuit, LED circuit, or IC's
Y
Indication is correct
N
(Data input system is out of order)
M, A, and P modes are all abnormal
Defects in reference current circuit, reference voltage circuit, Indication output system, HA, or IC's
Y
M, A, and P modes function correctly
N
(Exposure control output system is out of order)
M mode only is abnormal
Defects in AV/TV/BV circuit, Head amplifier, or IC's
Y
Normal
A mode only is abnormal
Defects in SV circuit, Head amplifier, or IC's
M, A, and P modes are all abnormal
Defects in M. SW circuit, MG1 circuit, MG2 circuit, Trg circuit, or IC's
P mode only is abnormal
Defects in IC's
M mode only is abnormal
Defects in IC's
A mode only is abnormal
Defects in head amplifier, integrated capacitor, or IC's
P mode only is abnormal
Defects in MG3 circuit or IC's

2. No Operation (Neither of B.C., Display, and Shutter do not Operate at all)

Power circuit
Reference voltage circuit

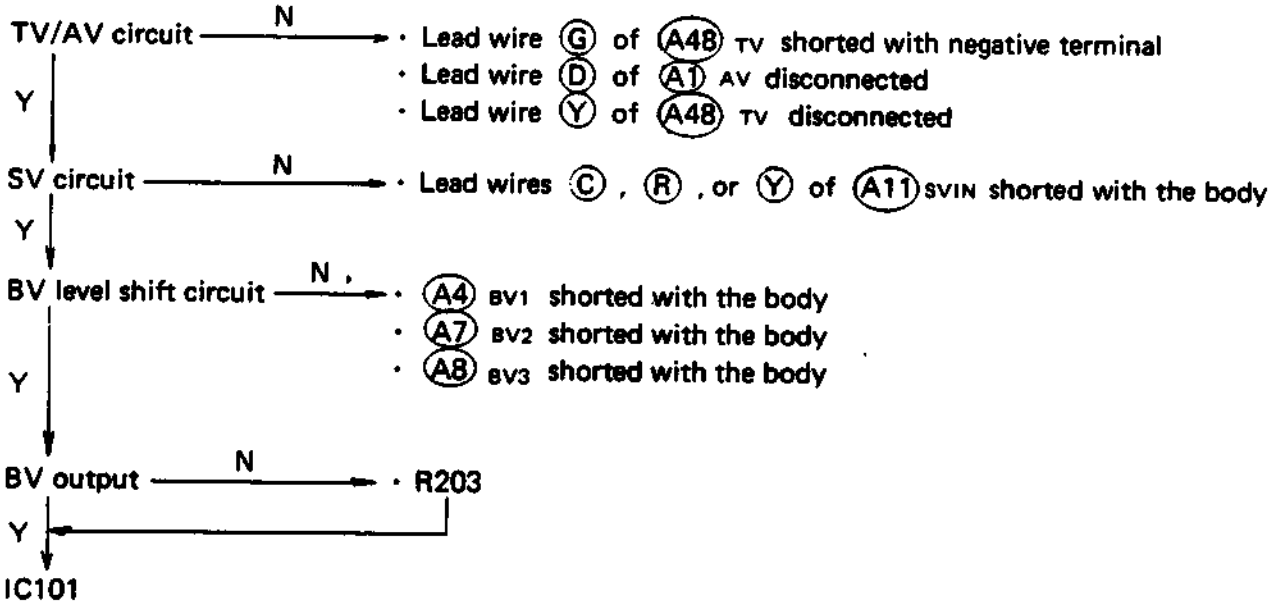


3. No Indication (E-13, 14)



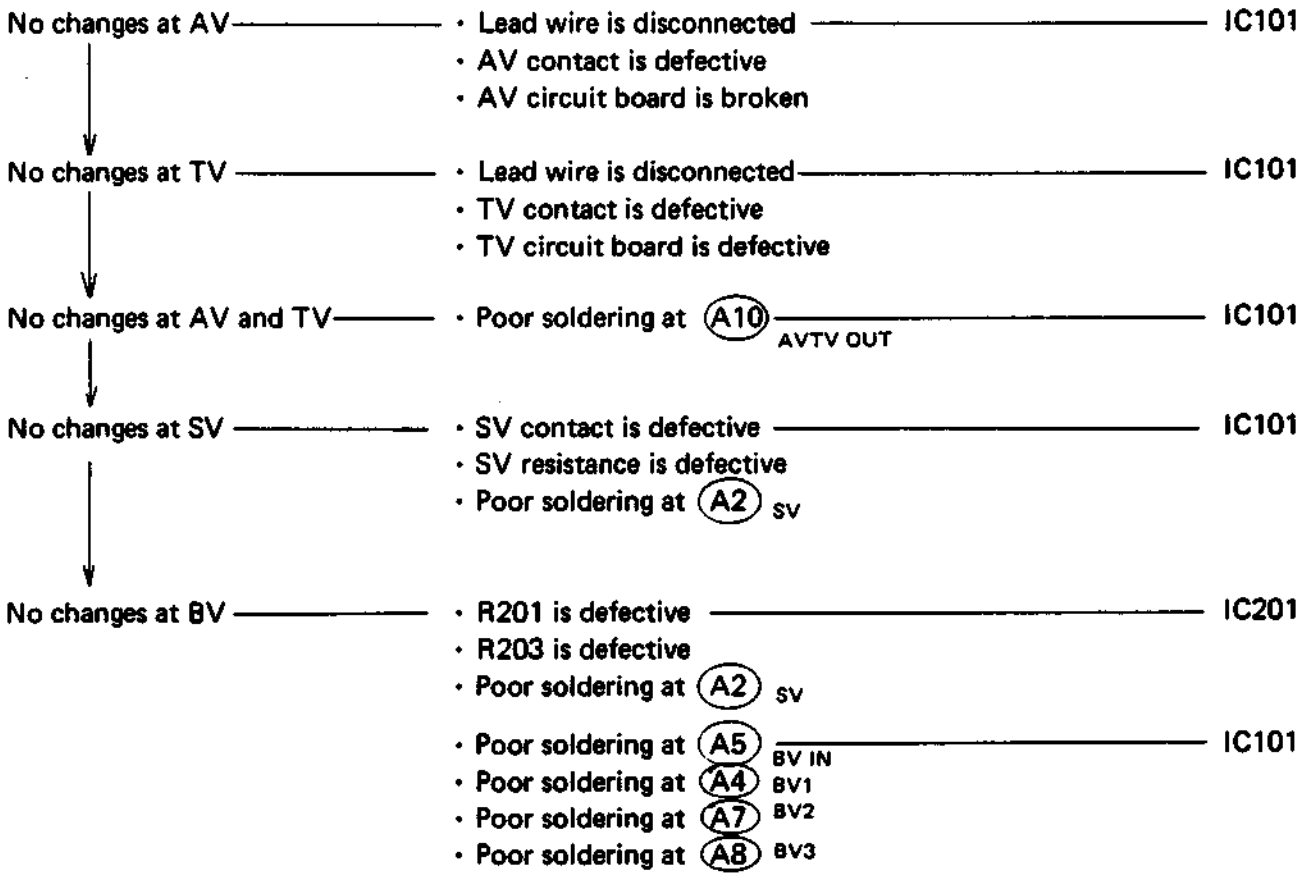
4. **Certain Item not Indicated**
   E15 ~ 18

If the shutter operates normally, the indicating circuits are defective.
If the shutter does not operate normally, check as follows:


TV/AV circuit
N
· Lead wire Ⓖ of (A48) TV shorted with negative terminal
· Lead wire Ⓓ of (A1) AV disconnected
· Lead wire Ⓨ of (A48) TV disconnected
Y
SV circuit
N
· Lead wires Ⓒ , Ⓡ , or Ⓨ of (A11) SVIN shorted with the body
Y
BV level shift circuit
N
· (A4) BV1 shorted with the body
· (A7) BV2 shorted with the body
· (A8) BV3 shorted with the body
Y
BV output
N
· R203
Y
IC101

5. Indications are not Changed When Data are Entered
E15 ~ 19

If the shutter operates normally, the indicating circuits are defective.
If the shutter does not operate normally, check as follows:


No changes at AV
• Lead wire is disconnected
• AV contact is defective
• AV circuit board is broken
IC101
No changes at TV
• Lead wire is disconnected
• TV contact is defective
• TV circuit board is defective
IC101
No changes at AV and TV
• Poor soldering at A10 AVTV OUT
IC101
No changes at SV
• SV contact is defective
• SV resistance is defective
• Poor soldering at A2 SV
IC101
No changes at BV
• R201 is defective
• R203 is defective
• Poor soldering at A2 SV
IC201
• Poor soldering at A5 BV IN
• Poor soldering at A4 BV1
• Poor soldering at A7 BV2
• Poor soldering at A8 BV3
IC101

6. PCV E38 ~ 41

Sound is low —— PCV is poorly adhered ——→ PCV is defective

No sound —— Is output detected at (B19) PCV OUT (Y) —— · Lead wires (A) or (R) disconnected at PCV
· PCV is defective

N ↓

IC102

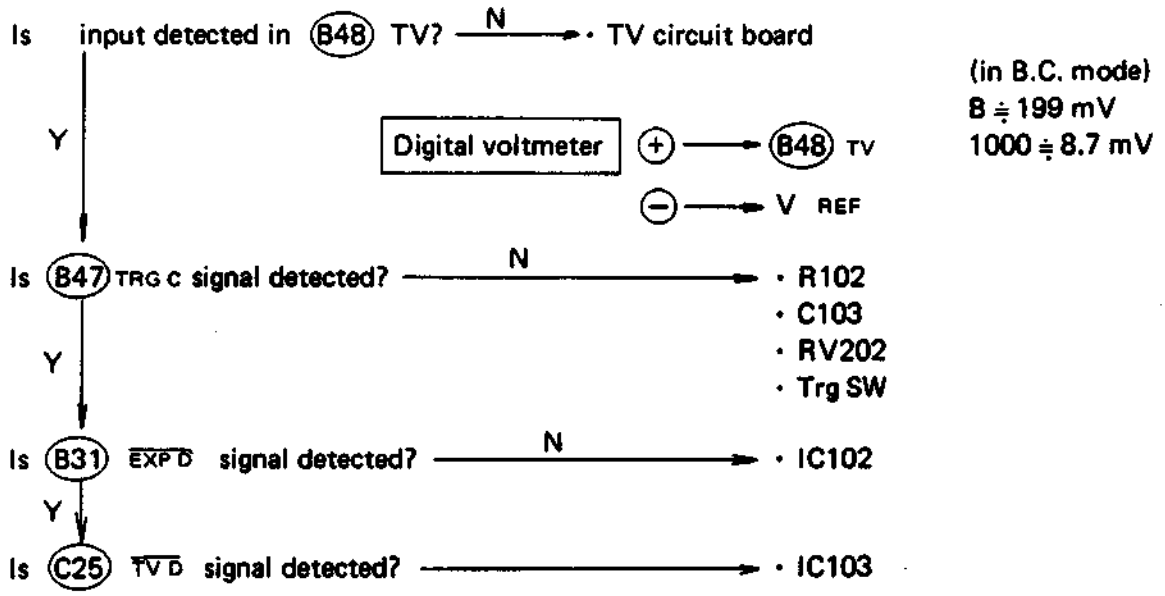
7. Reference Voltage (V_{REF}) is not Correct E15

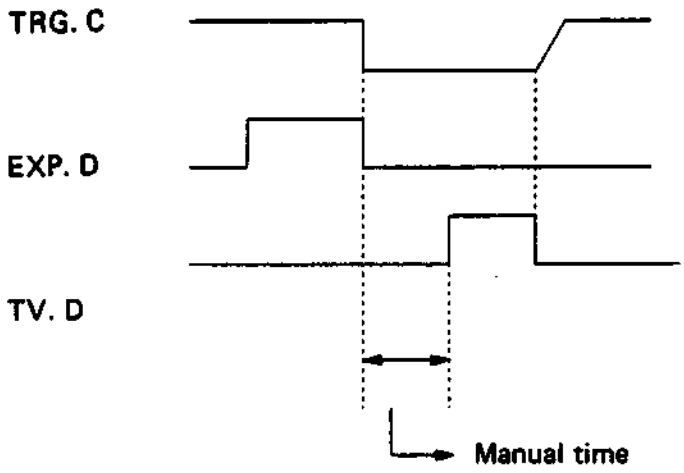
$V_{REF} \fallingdotseq 3V$ —— Lead wire (D) or (Y) of (A16) V_{REF} is shorted to the body

$V_{REF} \fallingdotseq 1 \sim 2.5V$ —— Check V_{REF} adjusting resistor (RV101)

$V_{REF} \fallingdotseq 0V$ —— · C106 is shorted
· Pattern is broken

8. Manual Time Incorrect (Assuming that Both Indications and Auto Mode are Correct) E29 ~ 31



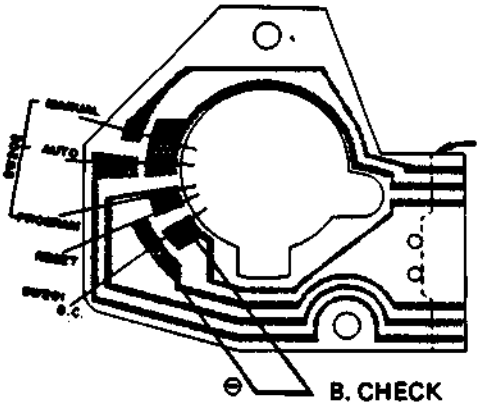


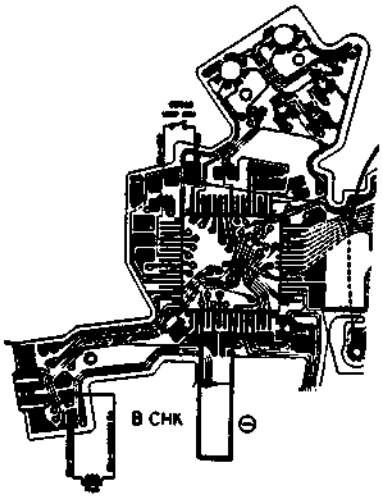
9. B.C. does not Operate (Neither PCV Sounds nor LED Comes On) E38 ~ 39

Remove the M selector and input on the pattern
→ N → Connect (C32) B CHK SW with negative terminal
→ N → IC103

Y ↓ M selector contact

Y ↓ Pattern is broken





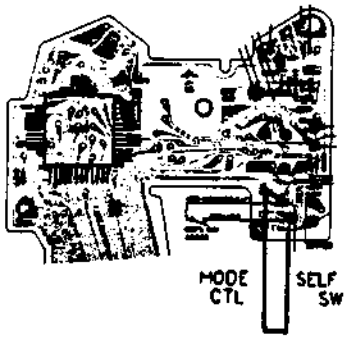
10. Self-timer does not Operate Correctly E40 ~ 41

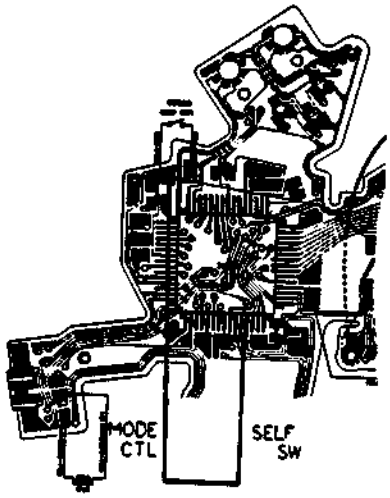
Is MODE CTL signal detected?
→ Y → Input on the M5 circuit board
→ N → Connect (C42) SELF SW with MODE CTL
→ N → IC103

N ↓ IC103

Y ↓ Lead wire (H) of SELF SW is disconnected

Y ↓ Pattern is broken



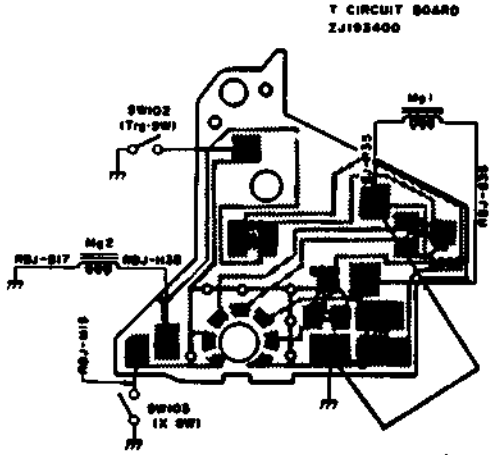


11. Shutter Locks in Both Auto and Manual Modes E24 ~ 28

A. Indications are normal, but shutter is locked from the first releasing.

Is M. SW input detected? —Y→ Is M. SW chattering? —Y→ Is L output detected at (B10) MG1? —Y→ Clicking sound is heared since the lead wire (R) is shorted with the body

- N: • M. SW is defective • Lead wire B is disconnected
- N: • M. SW contact pressure is abnormal • M. SW contact is dirty
- N: IC102 is defective
- N: • Q501 • C501 • MG1 • Pattern is broken



B. Shutter is locked from the second releasing

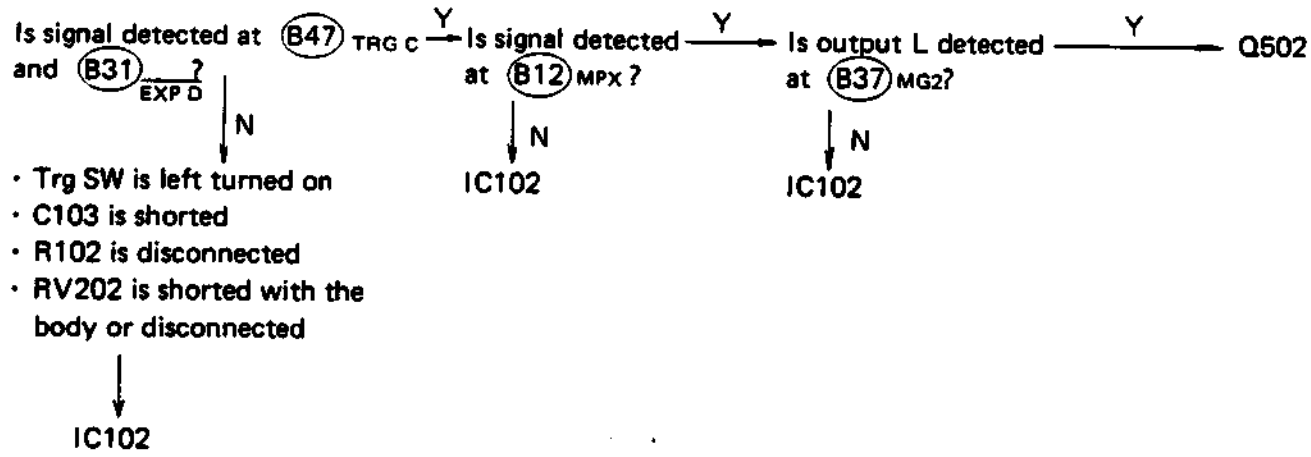
Is input detected at (B47) TRG C? —Y→ (B45) TRG / (B31) $\overline{\text{EXP D}}$

- N: • Trg SW is disconnected • Trg SW is shorted to the body • RV202 • C103 • Pattern is broken

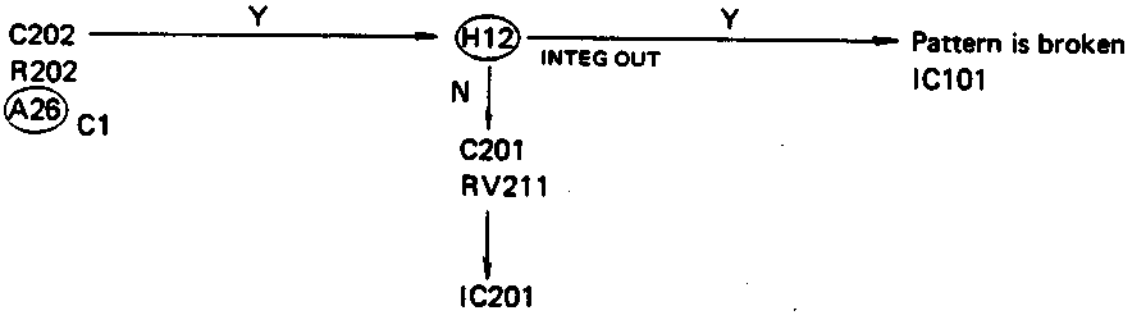
Is output detected at (B45) TRG or (B31) EXP D?

- No output at either or both of them: IC102

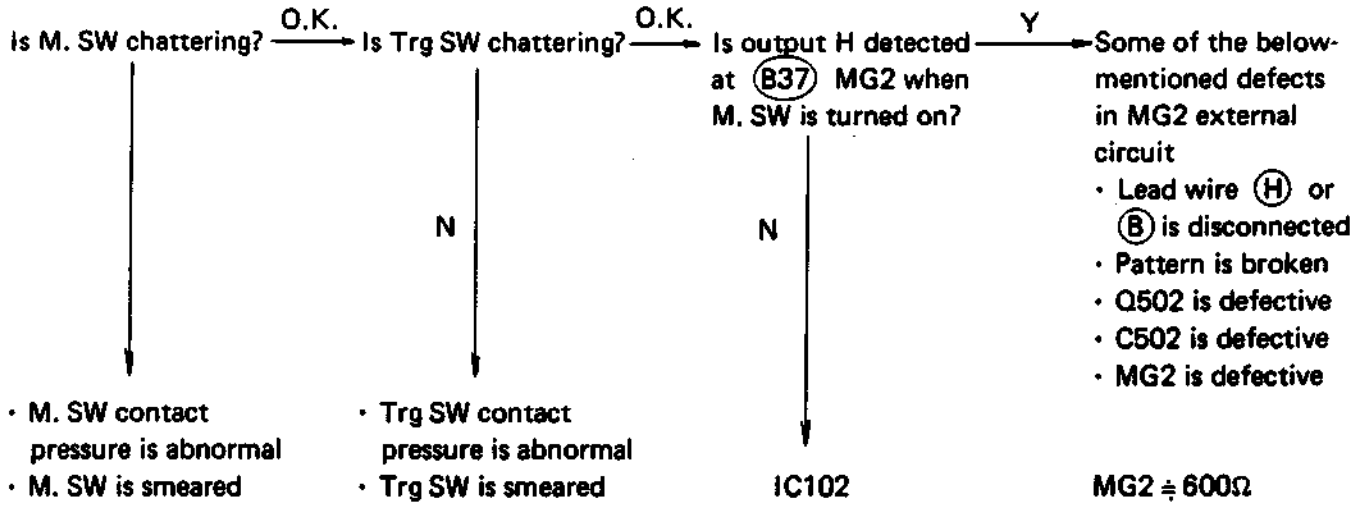
12. Shutter Stays Open in Both Auto and Manual Modes (E26 ~ E28)



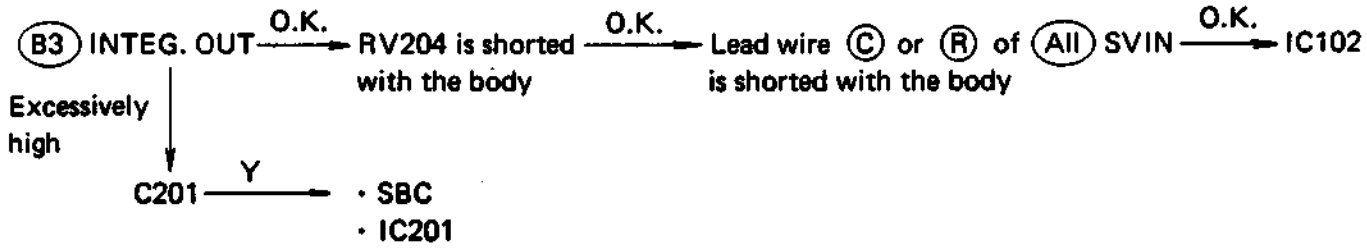
13. Shutter Stays Open in Auto Mode Only



14. Shutter always operates at High Speed in Both Auto and Manual Modes


Is M. SW chattering?
O.K.
Is Trg SW chattering?
O.K.
Is output H detected at (B37) MG2 when M. SW is turned on?
Y
Some of the below-mentioned defects in MG2 external circuit
· Lead wire (H) or (B) is disconnected
· Pattern is broken
· Q502 is defective
· C502 is defective
· MG2 is defective
N
N
· M. SW contact pressure is abnormal
· M. SW is smeared
· Trg SW contact pressure is abnormal
· Trg SW is smeared
IC102
MG2 ≒ 600Ω

15. Shutter always operates at High Speed in Auto Mode Only



16. Flash Circuit E34 ~ 37

A. Flash mode is not selected (in the auto mode)

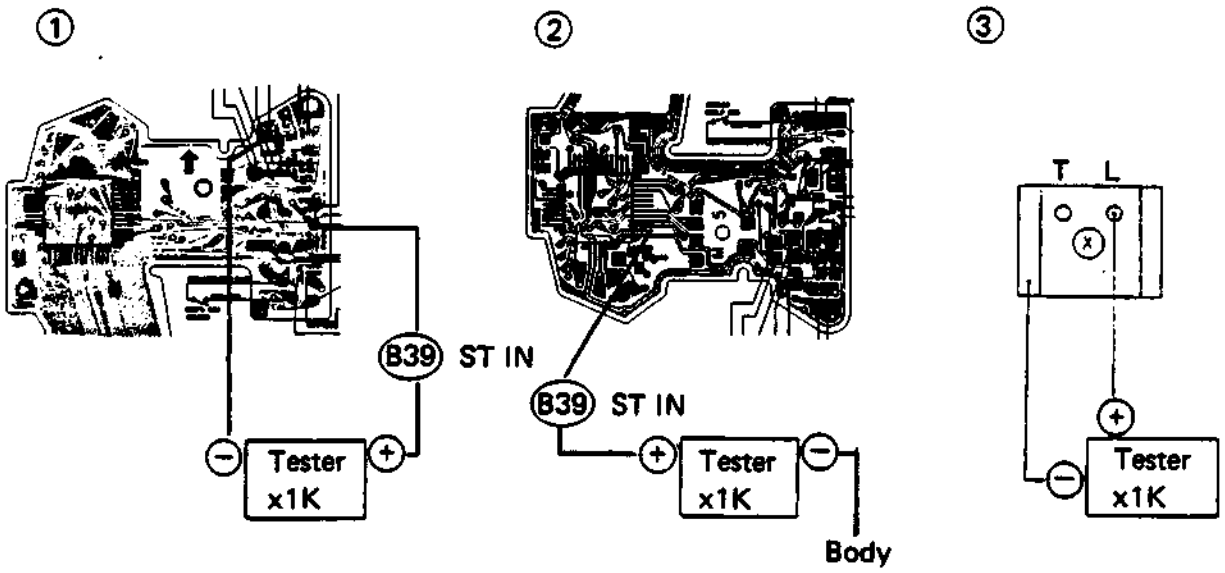
Is it selected by using the M5 circuit board? ① —Y→ Is it selected by connecting L terminal to the positive and the shoe to the netative terminal? ③ —N→ · Upper circuit board is defective · Lead Wire (Y) is disconnected ②

N ↓

Is it selected by connecting the (B39) STIN to the positive and the body to the negative terminal? —Y→ Pattern is broken

N ↓

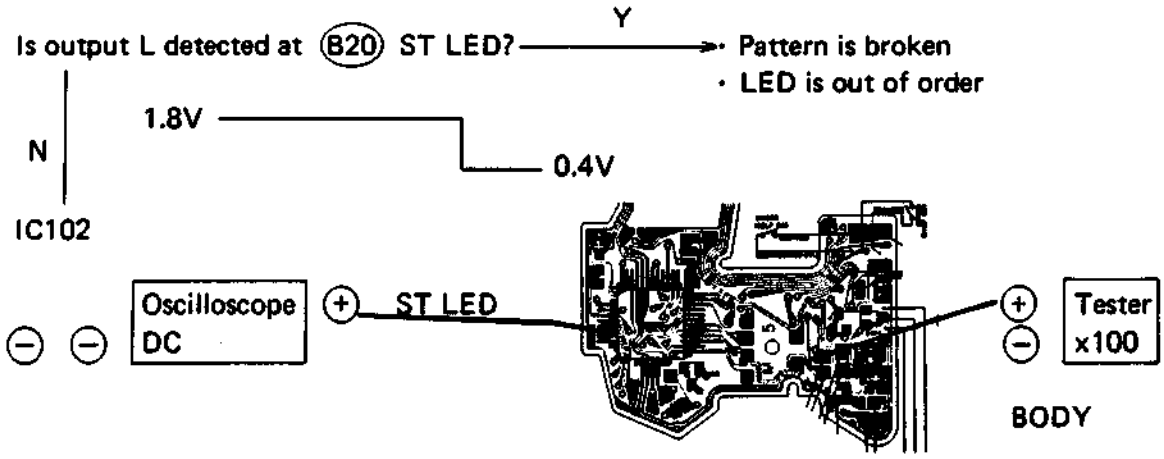
IC102



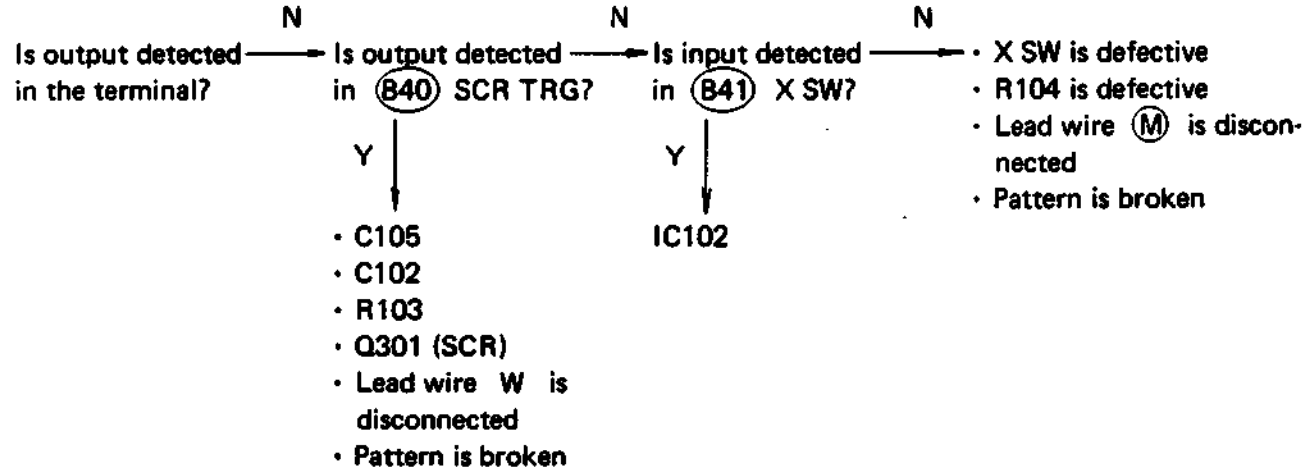
The circuit is judged to be OK if terminal X is turned off at 125 or more and on at 60 or less when wiring is effected as shown above and a tester of X 1K is used.

Terminal X Approx. 3.2V

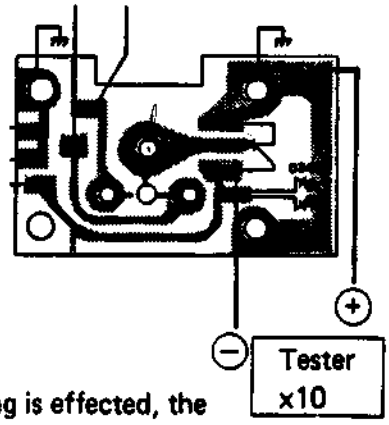
B. Charge Completion Indicator LED⚡ does not come on



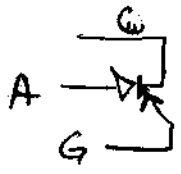
C. No flashing



SCR checking



If flashing is effected, the circuit is OK.



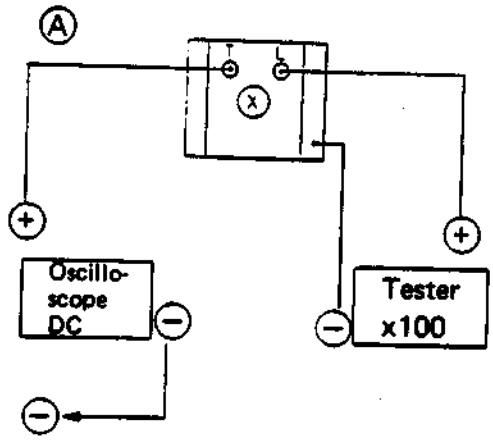
D. No Light Controlling (when mounting a T-flash)

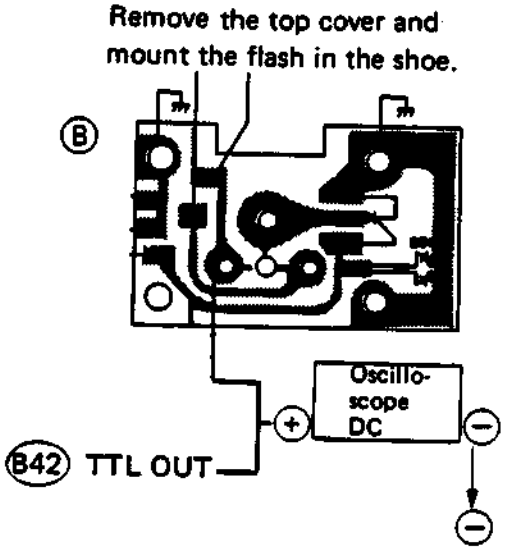
· Full-power flashing

Is output L detected in TTL terminal? —N→ Is output detected at (B42) TTL OUT? —N→ IC102

Y ↓

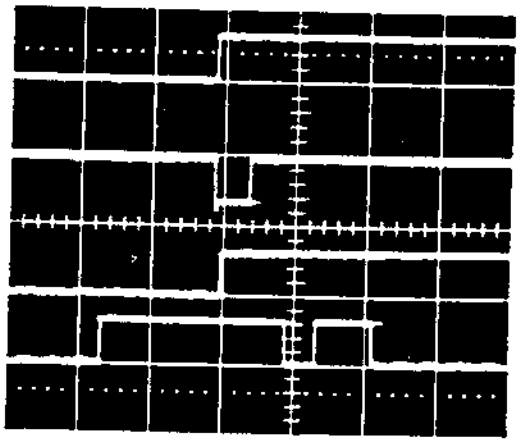
- Upper circuit board is defective
- Lead wire (H) is disconnected
- Pattern is broken





Method B — X SW, (B42) TTL OUT

Method A — X SW, (B42) TTL OUT



0.5V 50mS

· Small-power flashing

IC102 is defective

G

PARTS WHERE OIL, GREASE, ETC. SHALL BE USED

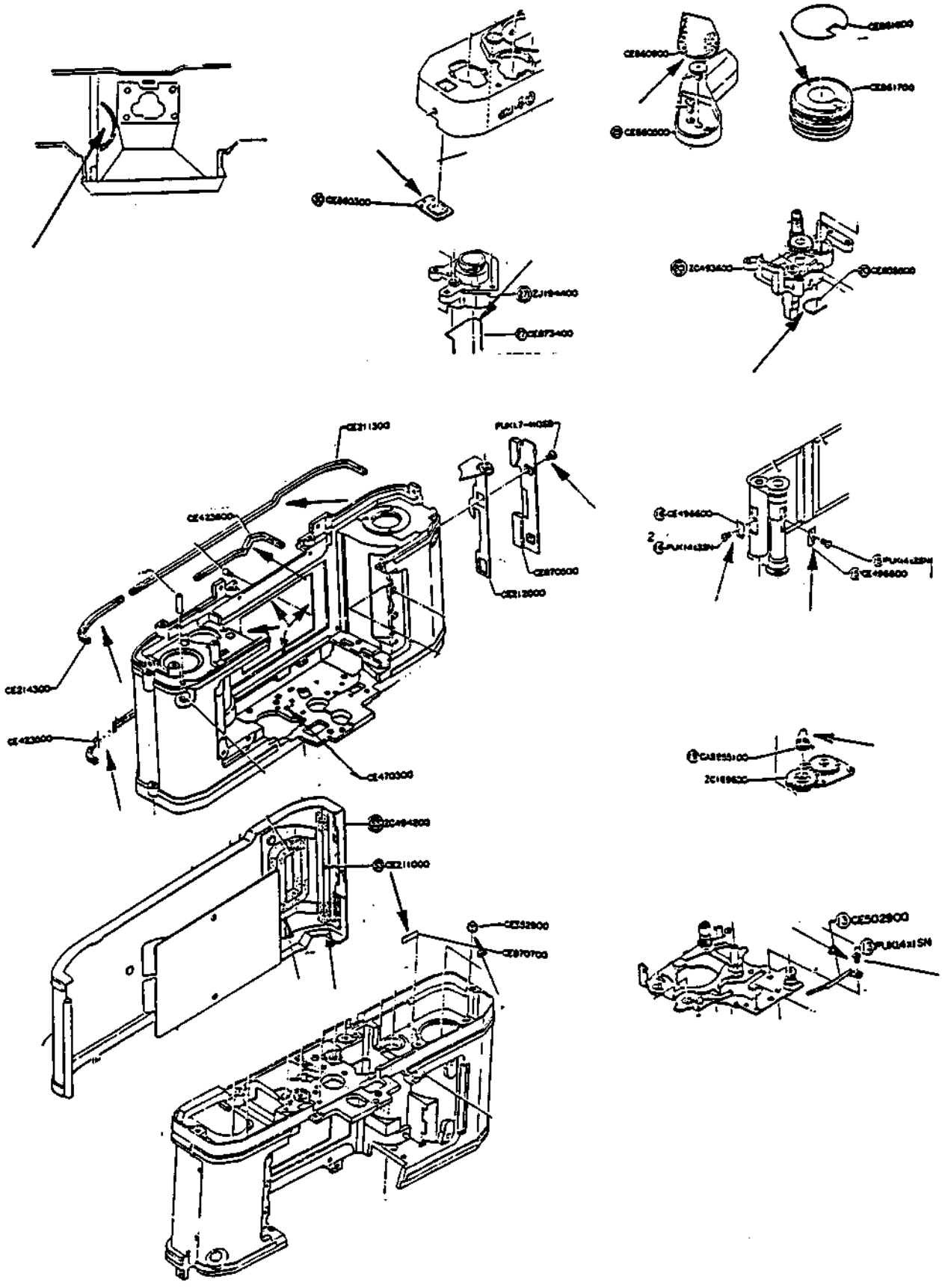
G. PARTS WHERE OIL, GREASE, ETC. SHALL BE USED

CONTENTS

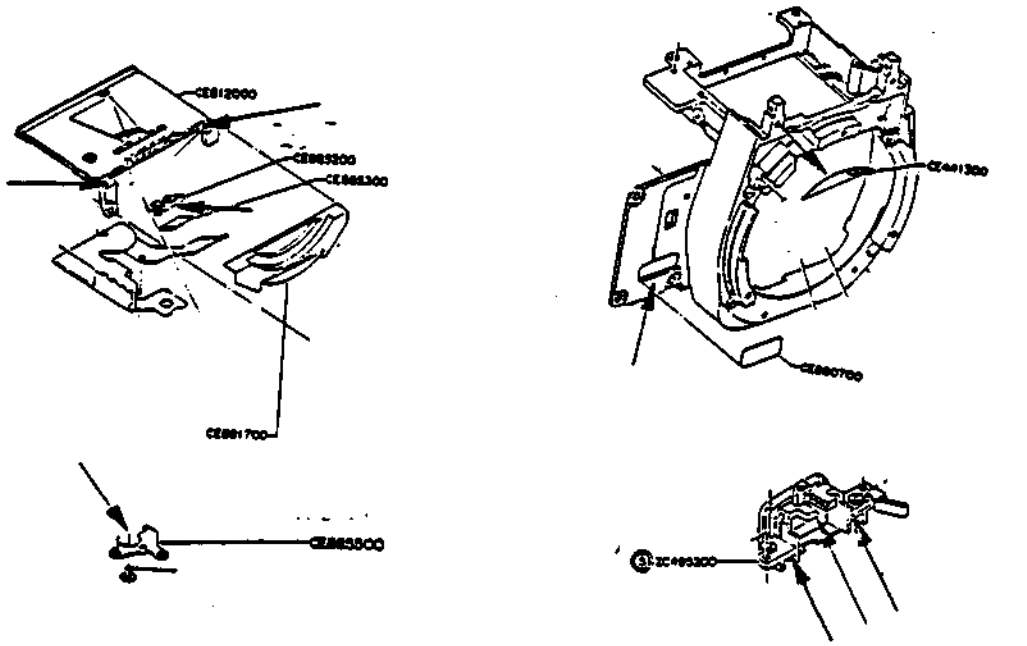
1. Pliobond G-1
2. Bell Lock G-3
3. Cemedine (Cement) 3000 RS G-3
4. Alon Alpha G-4
5. Araldite (Cement) G-4
6. Molycoat Grease G-5
7. ED-16 Grease G-6
8. 023P Grease G-6
9. EP Grease G-7
10. H-26 Grease G-7
11. Cosmorublic G-7
12. Fluorad FD-721 (Oil Barrier) G-7

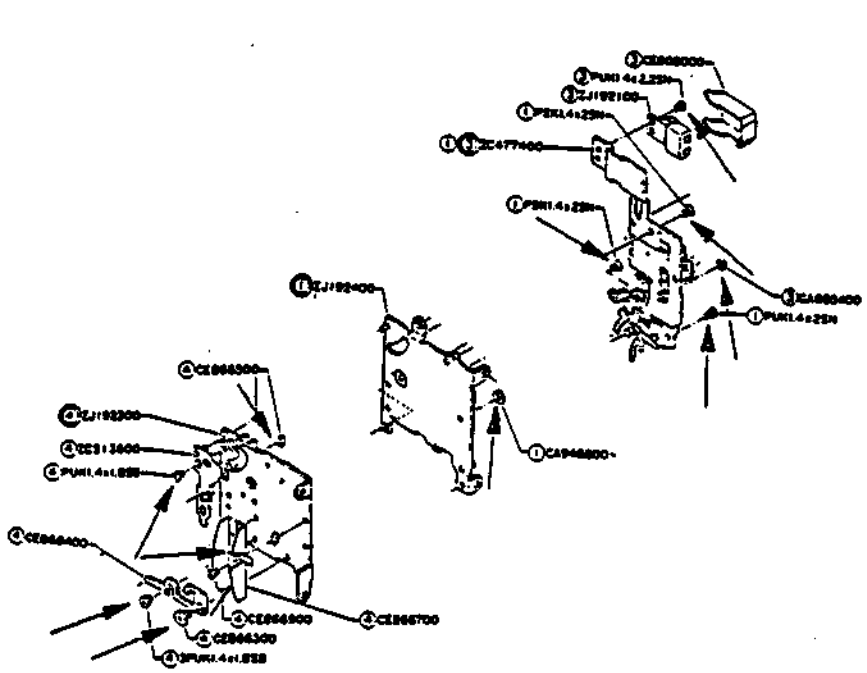
G. PARTS WHERE OIL, GREASE, ETC. SHALL BE USED

1. Pliobond



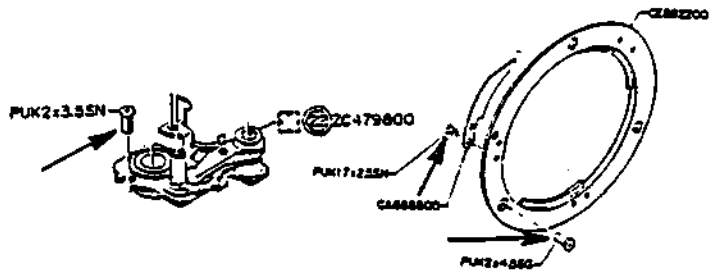
Pliobond





2. Bell Lock

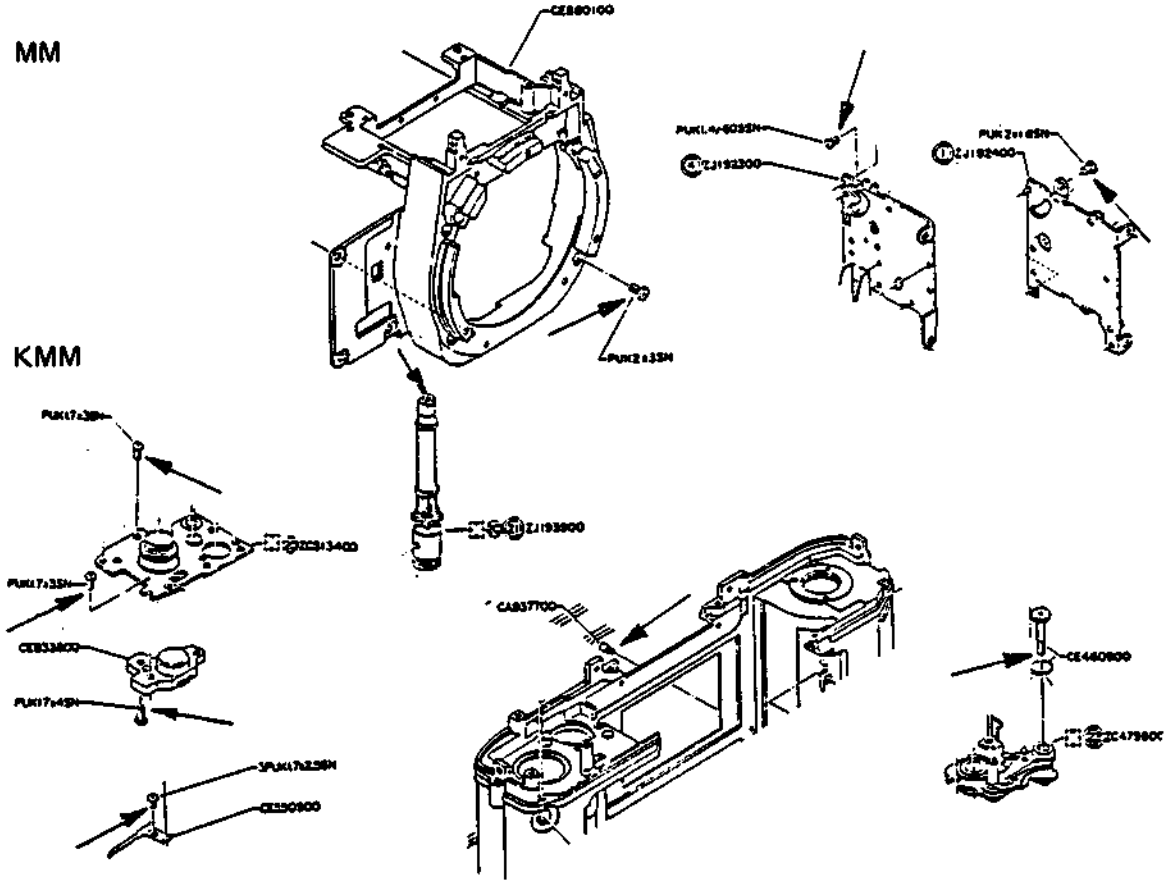
2-1. SM



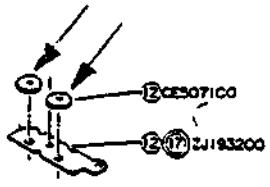
2-2. KSM

2-3. MM

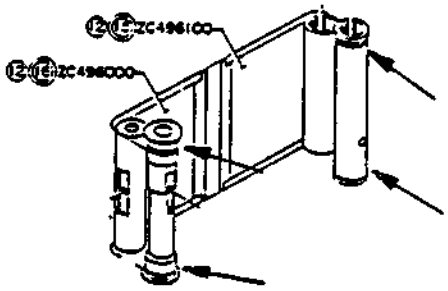
2-4. KMM



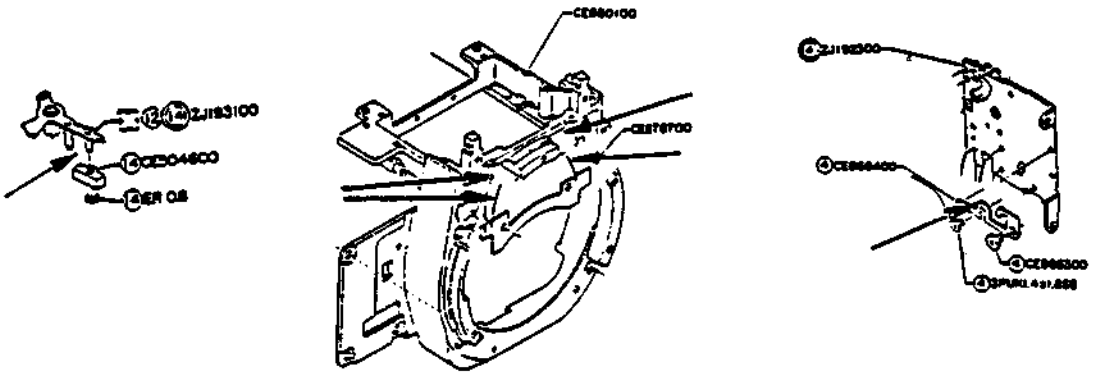
3. Cemedine (Cement) 3000 RS



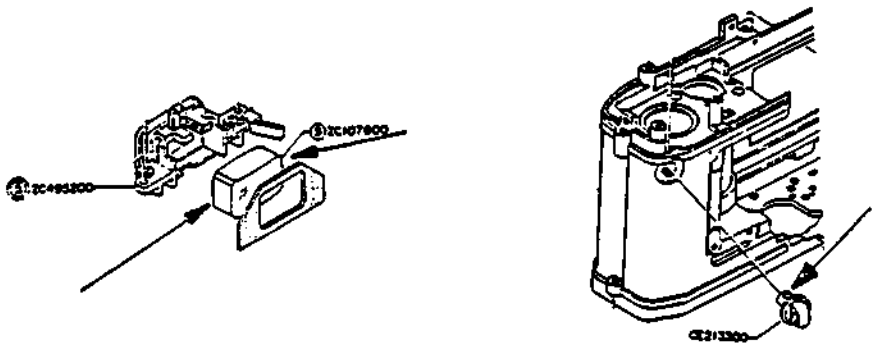
Cemedine 3000 RS



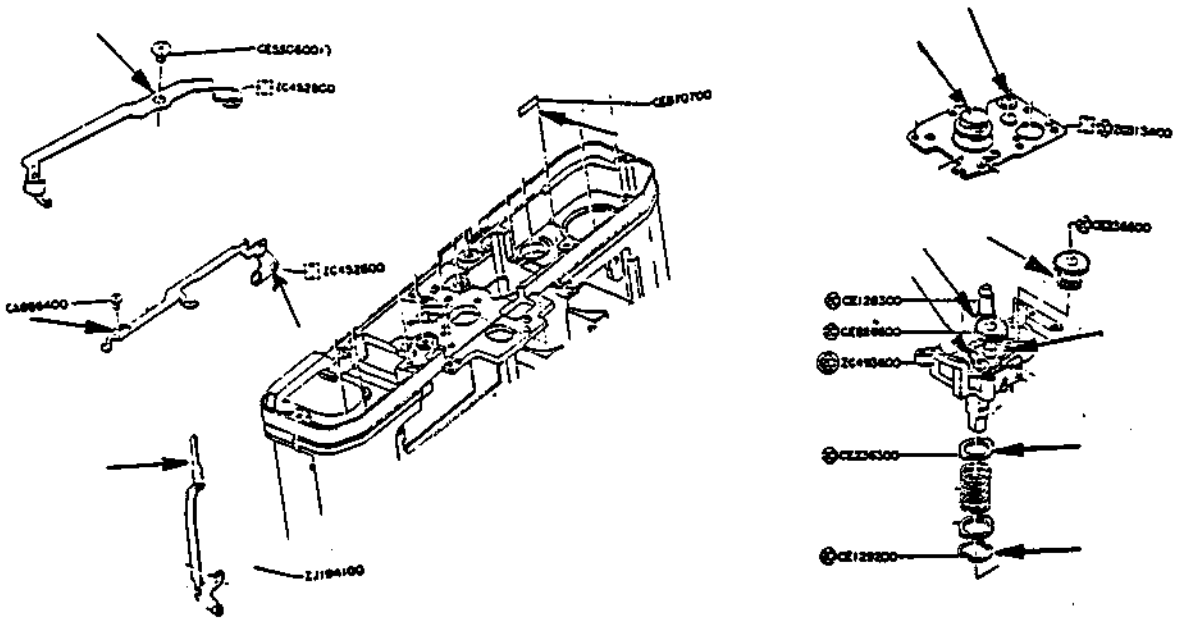
4. Alon Alpha



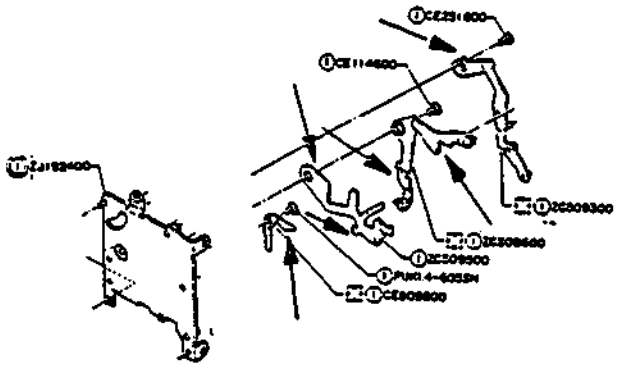
5. Araldite (Cement)



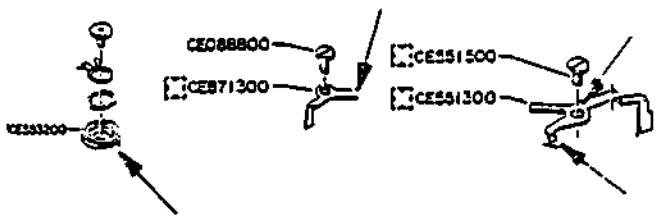
6. Molycoat Grease



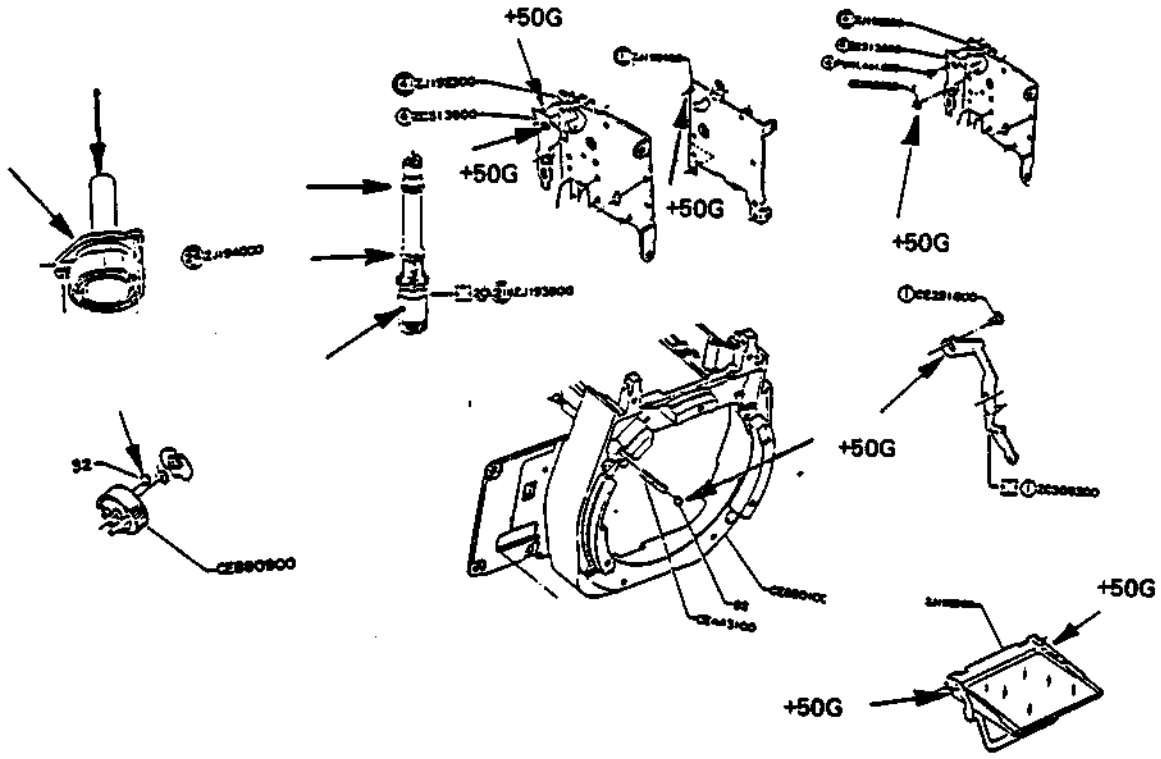
Molycoat grease 020P



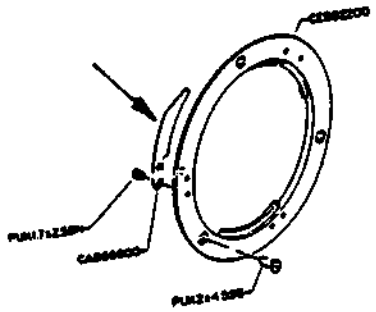
Molycoat grease U



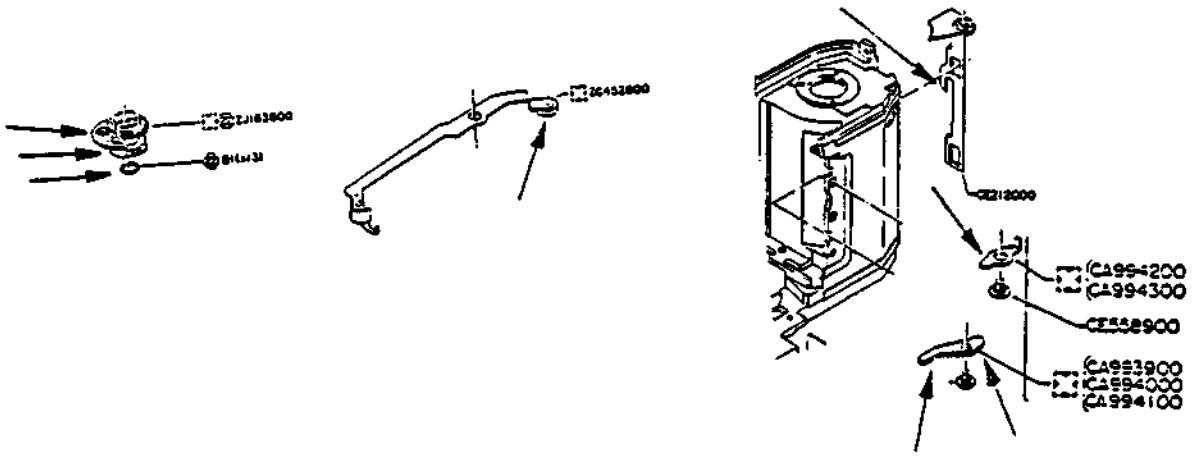
7. ED-16 Grease



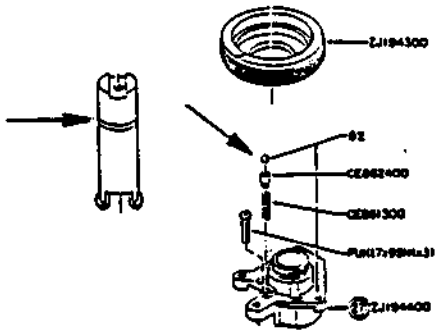
8. 023P Grease



9. EP Grease

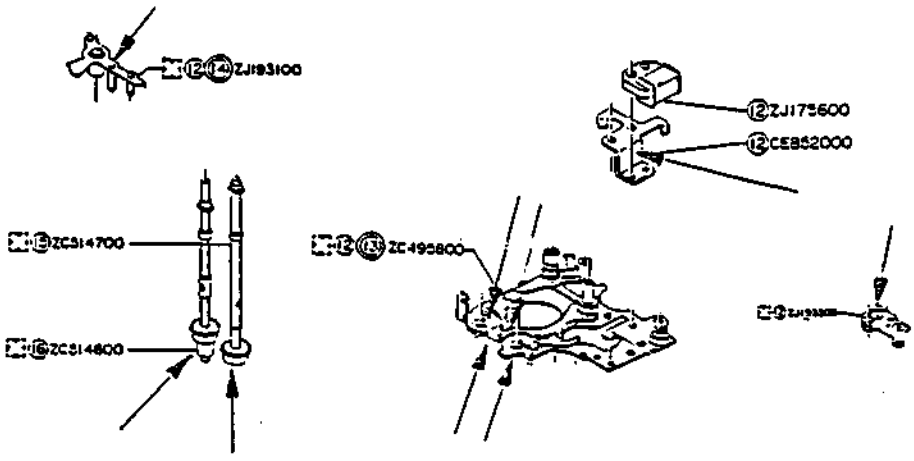


10. H-26 Grease



11. Cosmorublic

12. Fluorad FD-721 (Oil Barrier)

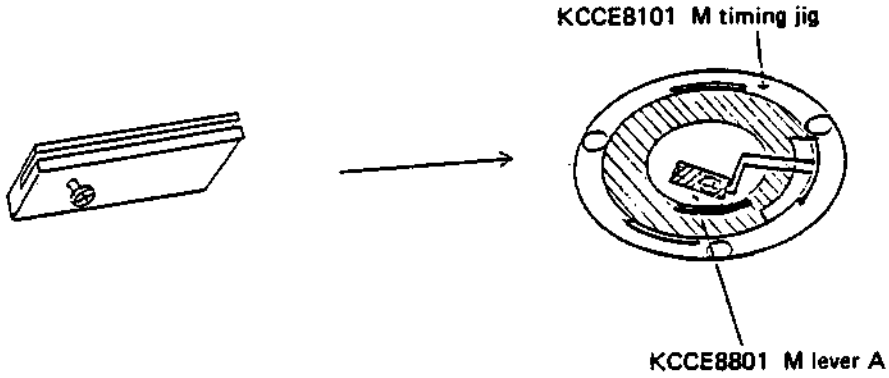


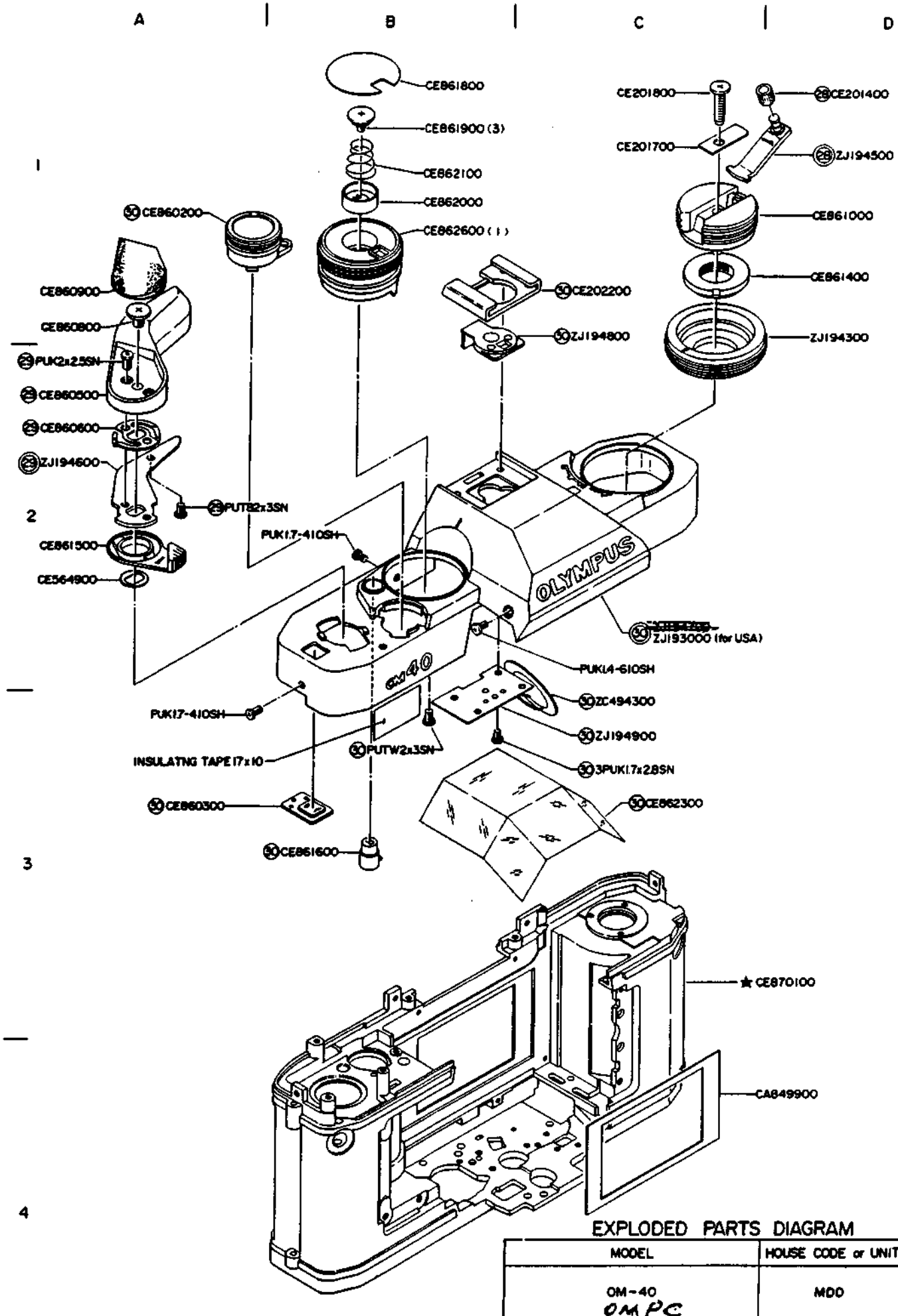
H

SPECIAL TOOLS

H. SPECIAL TOOLS

KCCE8801 M Lever A





EXPLODED PARTS DIAGRAM

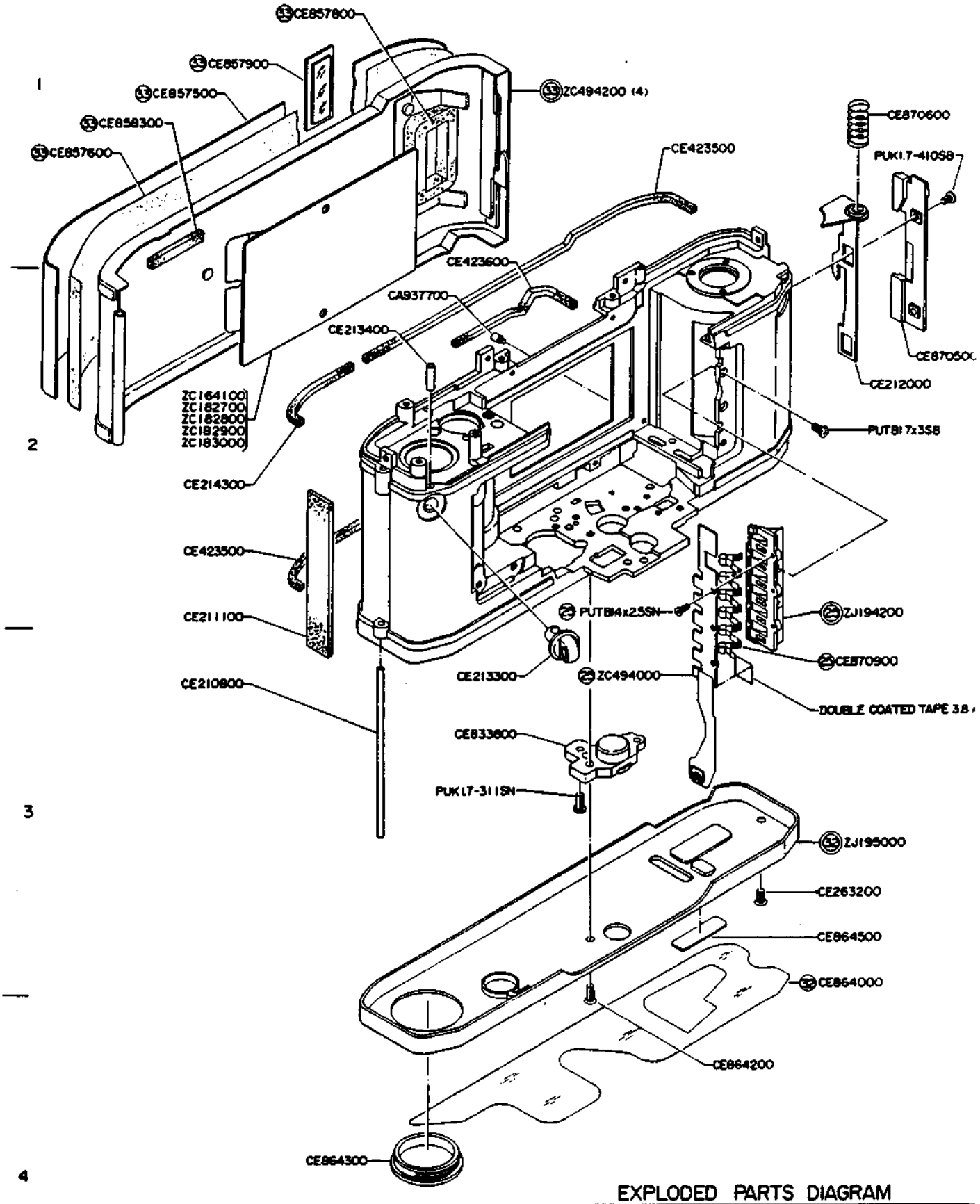
MODEL	HOUSE CODE or UNIT	FIG
OM-40 OMPC	MDD	1/8

OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN

0587

A B C D

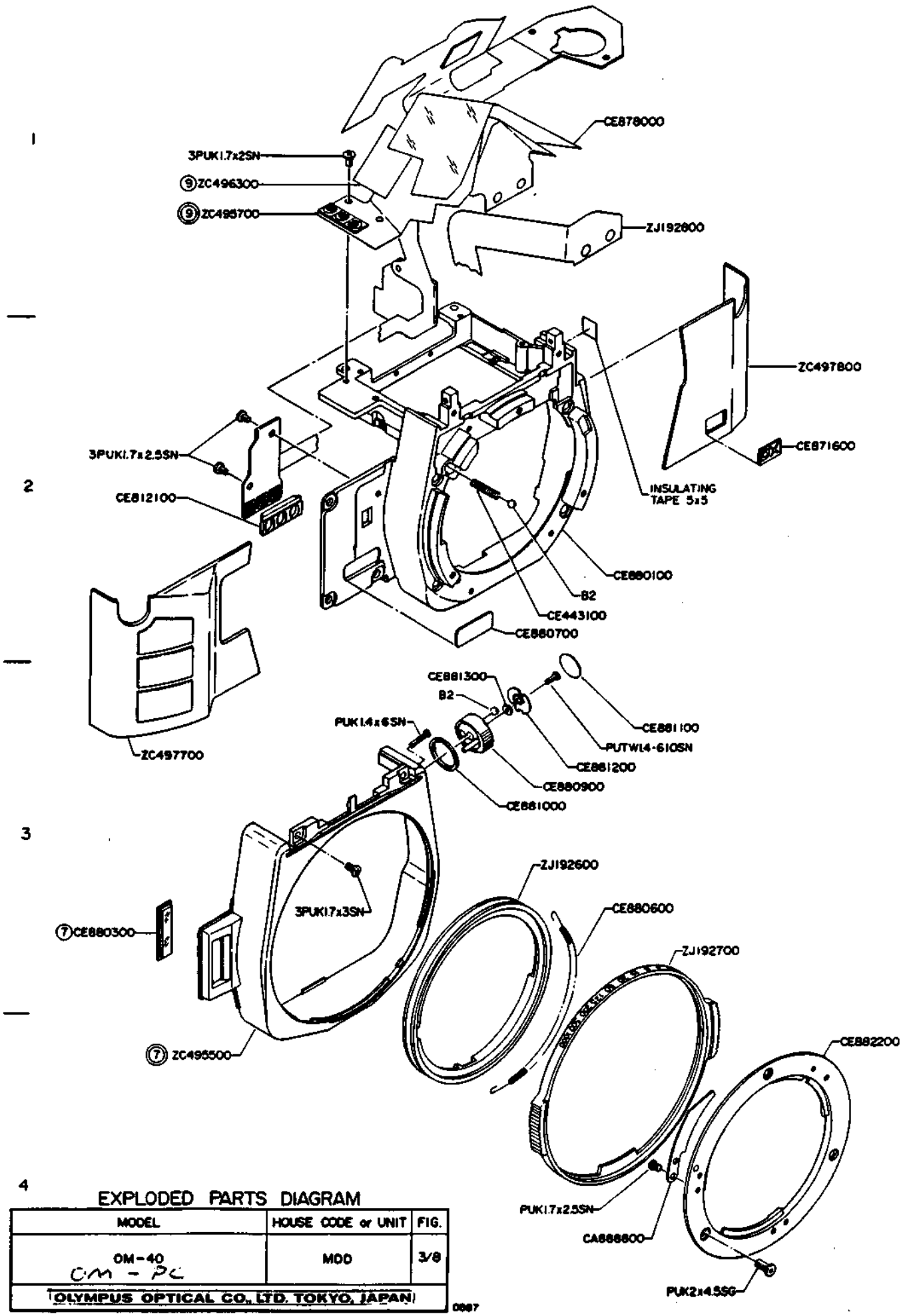
1 2 3 4



EXPLODED PARTS DIAGRAM

MODEL	HOUSE CODE or UNIT	FIG
OM-40 OM-PC	M00	2/6
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

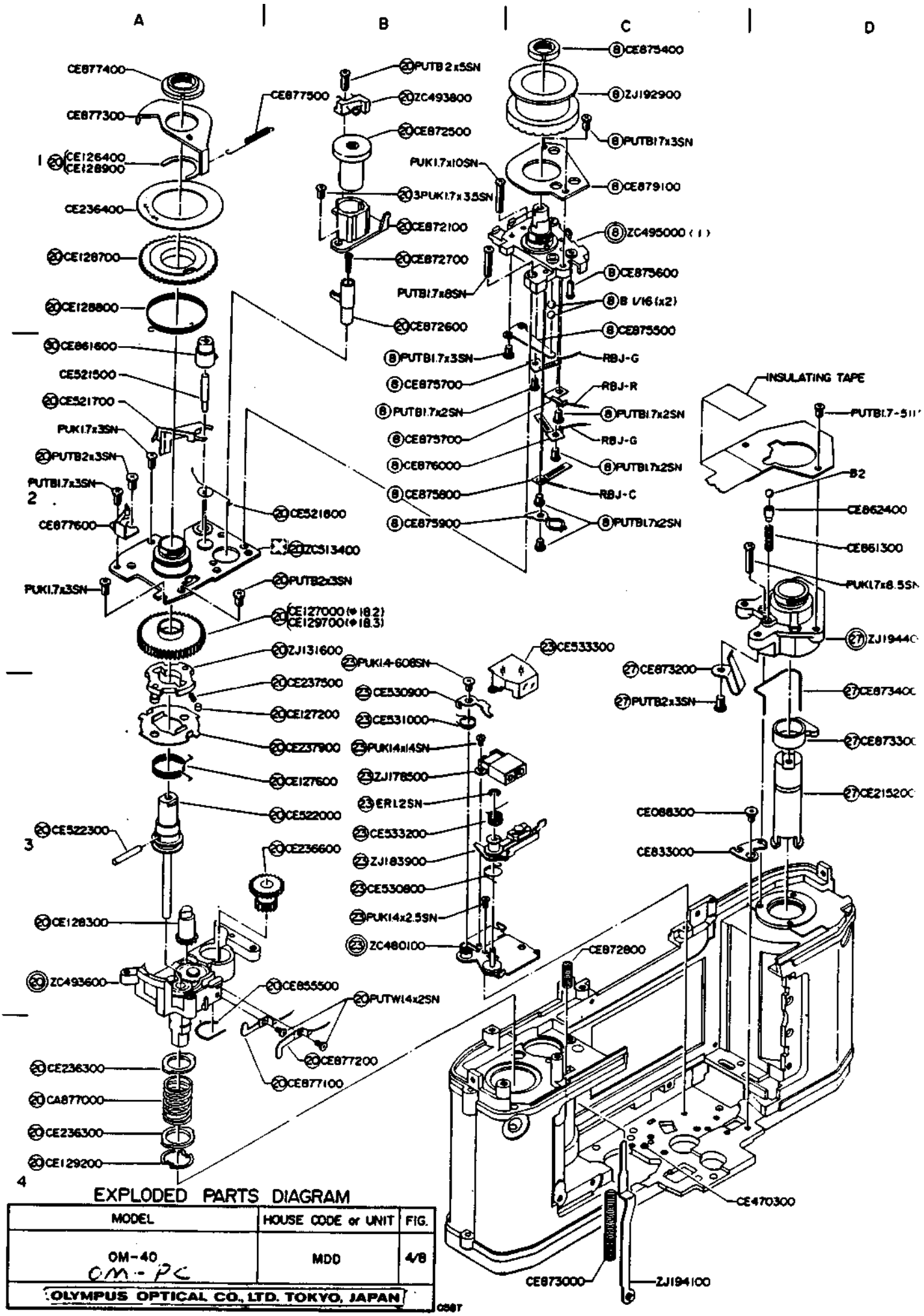
0567



EXPLODED PARTS DIAGRAM

MODEL	HOUSE CODE or UNIT	FIG.
OM-40 OM - PC	MOD	3/8
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

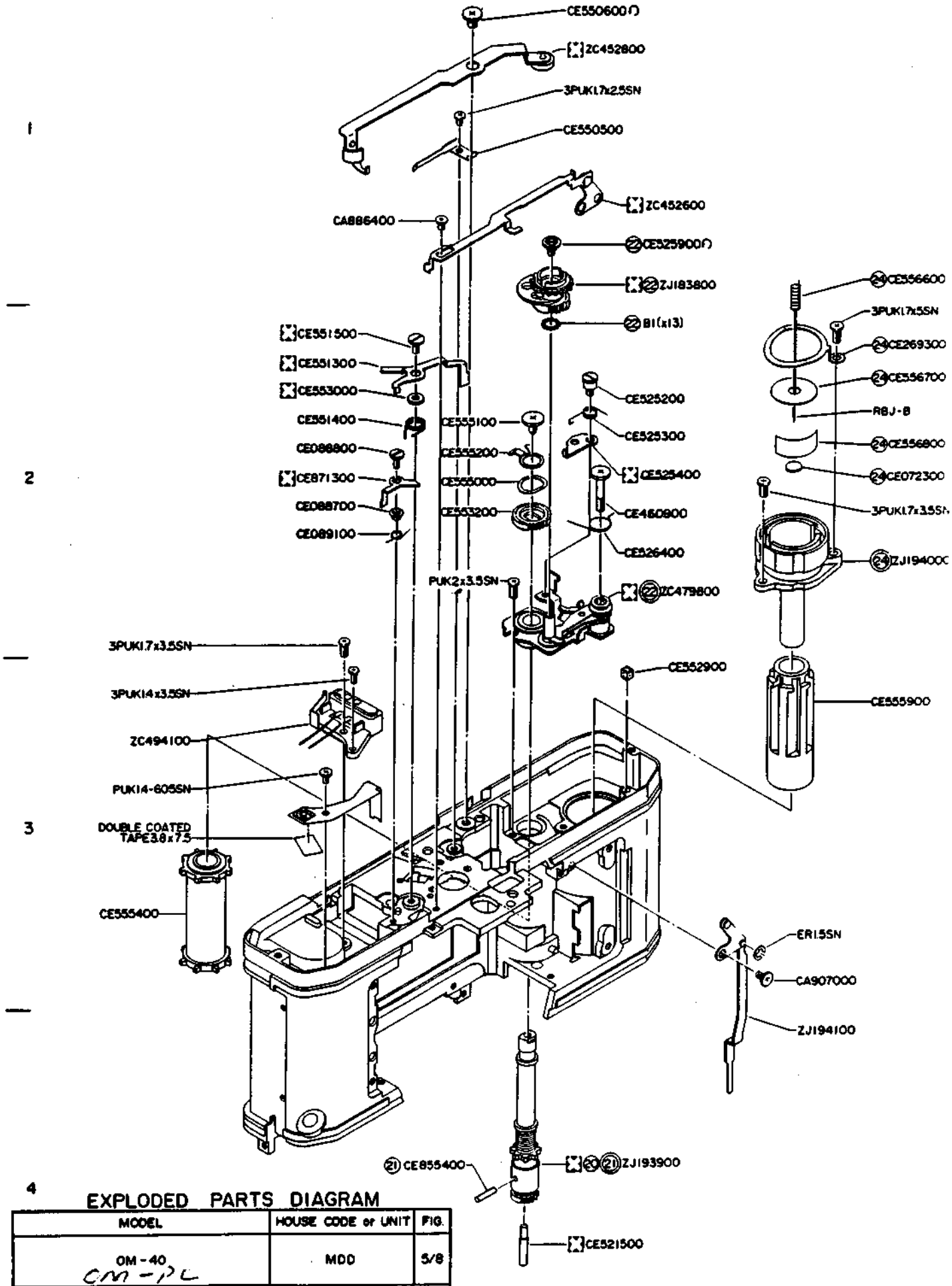
0887



EXPLODED PARTS DIAGRAM

MODEL	HOUSE CODE or UNIT	FIG.
OM-40 OM-PC	MDD	4/8
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

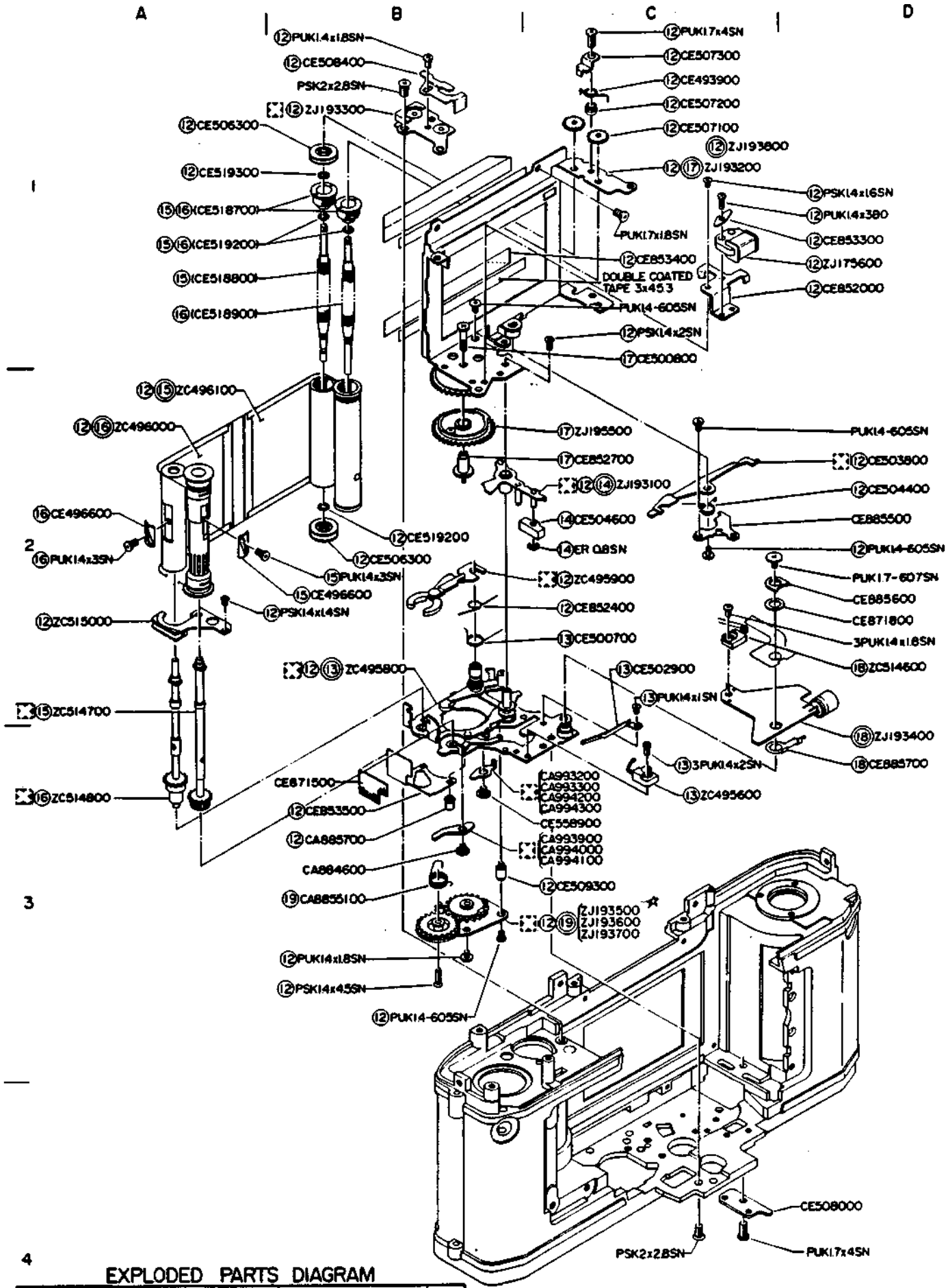
0587



EXPLODED PARTS DIAGRAM

MODEL	HOUSE CODE or UNIT	FIG.
OM-40 CM-1L	MDD	5/8
OLYMPUS OPTICAL CO. LTD. TOKYO, JAPAN		

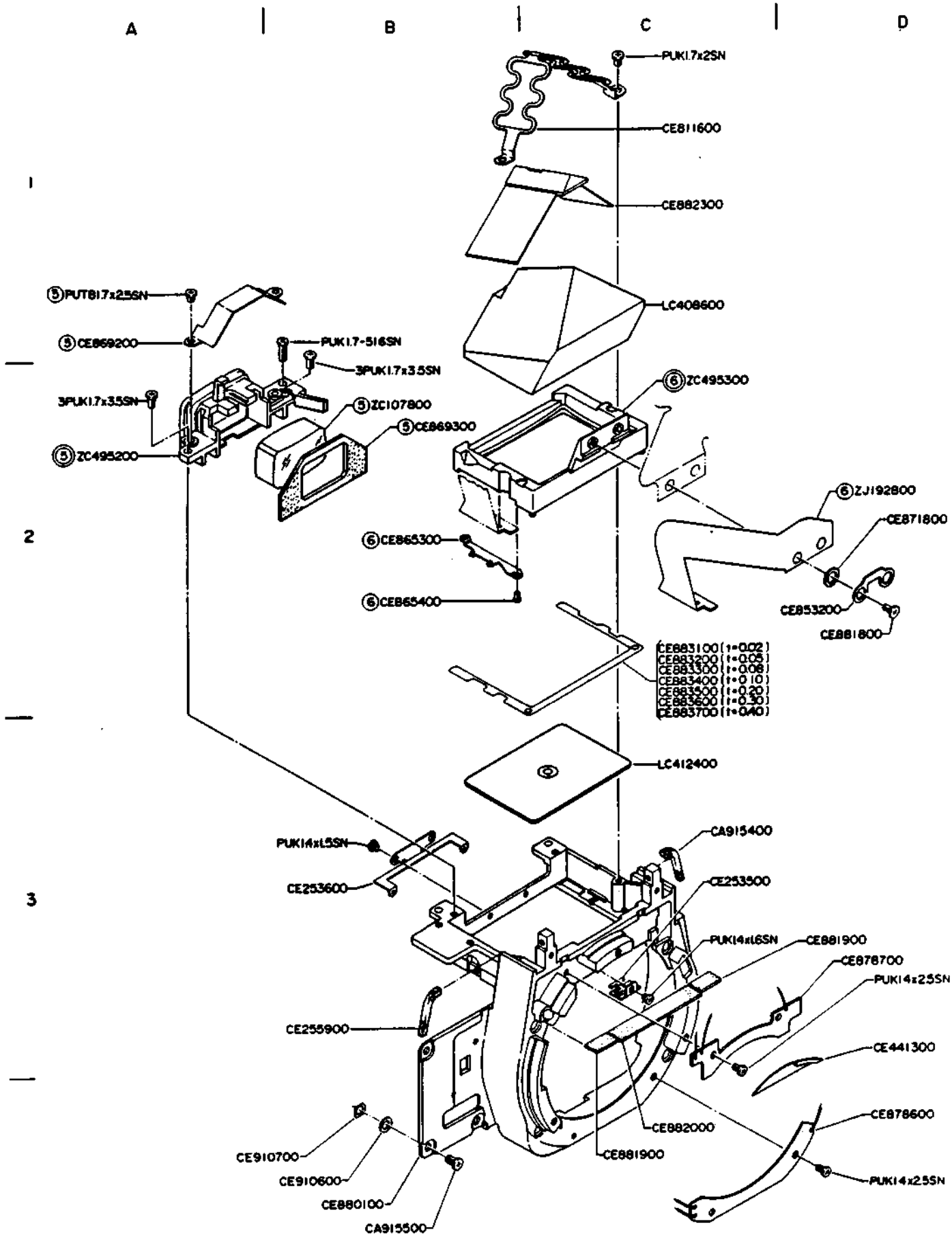
0587



EXPLODED PARTS DIAGRAM

MODEL	HOUSE CODE or UNIT	FIG.
OM-40 CM-PC	MOD	6/8
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

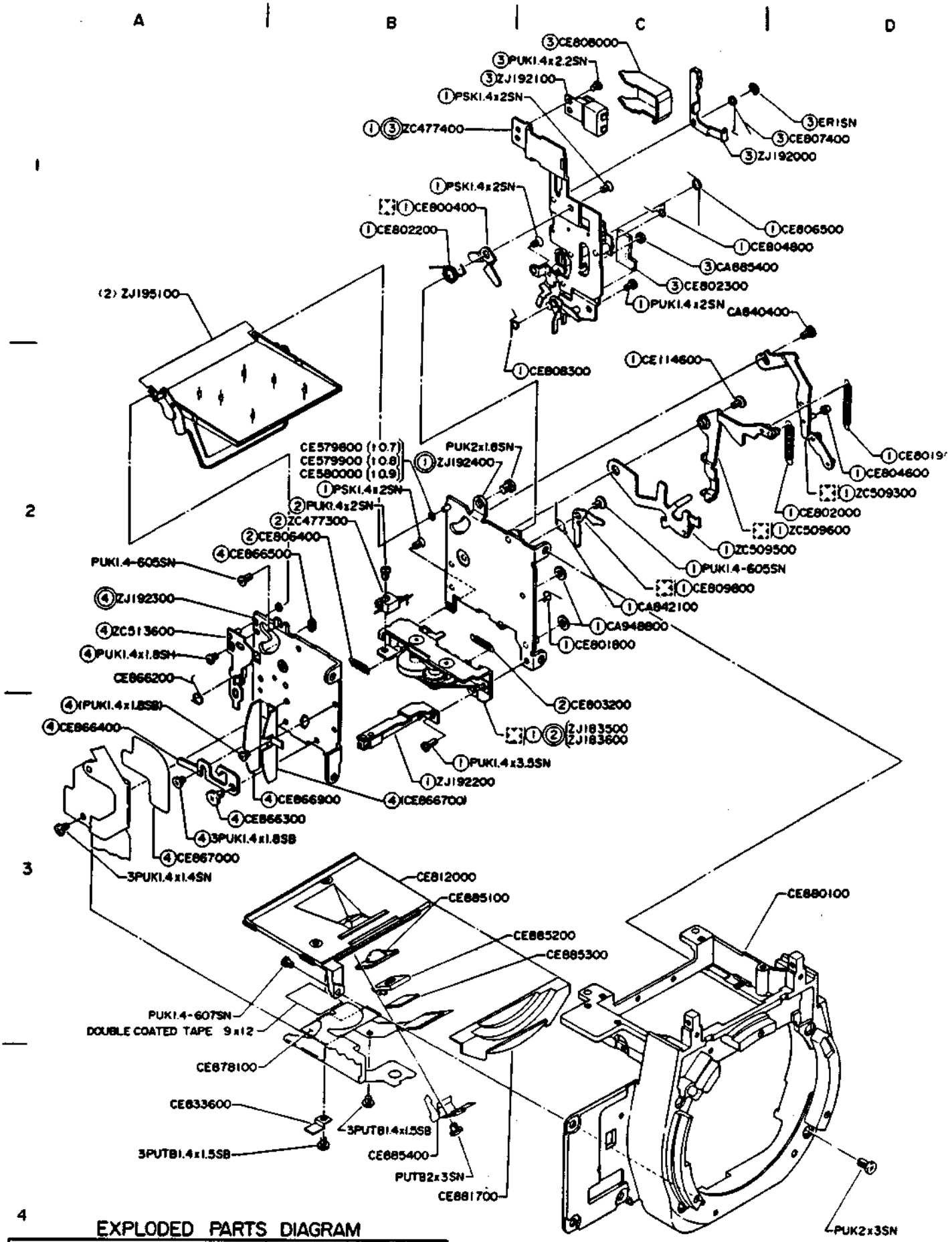
0987



EXPLODED PARTS DIAGRAM

MODEL	HOUSE CODE or UNIT	FIG.
OM-40 OM-PC	MOD	7/8
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

0887



EXPLODED PARTS DIAGRAM

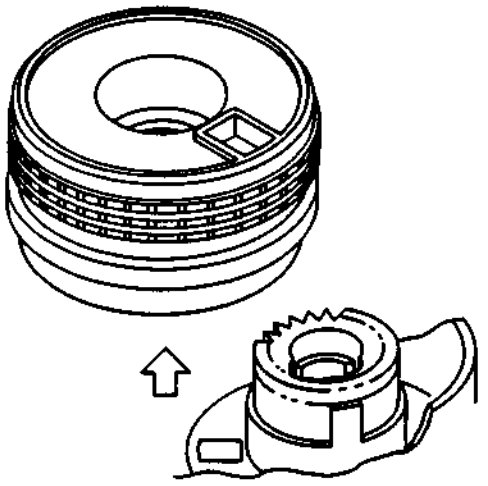
MODEL	HOUSE CODE or UNIT	FIG.
OM-40 OM-PC	MDD	8/8
OLYMPUS OPTICAL CO., LTD. TOKYO, JAPAN		

0587

〈 1 〉

OLD

CE861700



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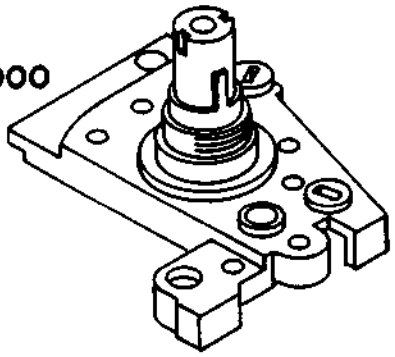

NEW

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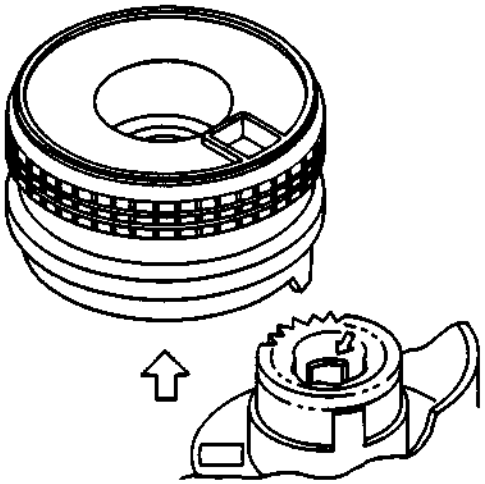

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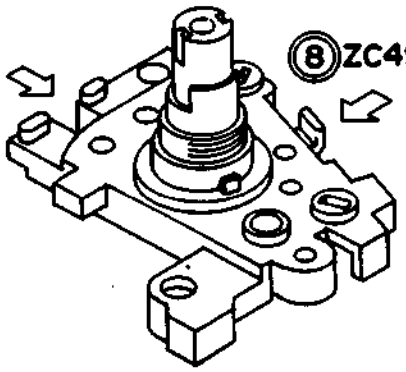
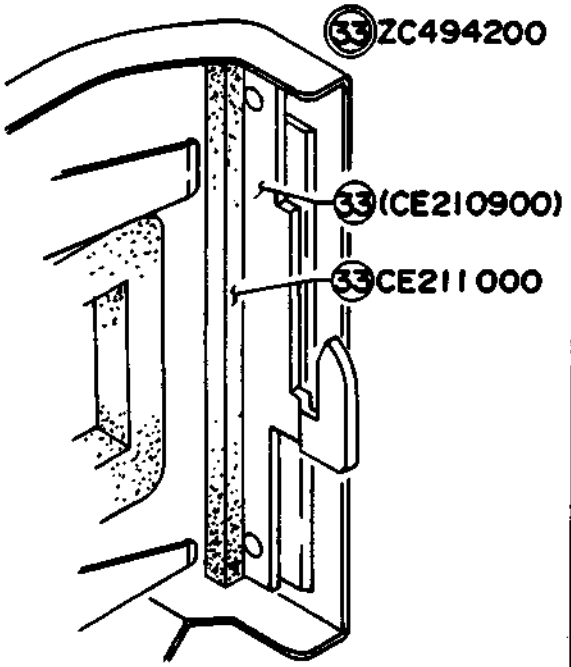


〈 4 〉

OLD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33 (CE210900)
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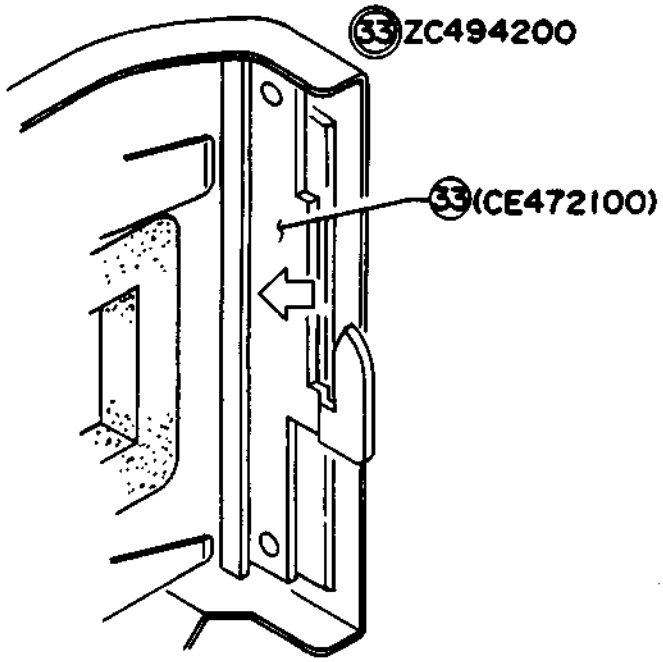
NEW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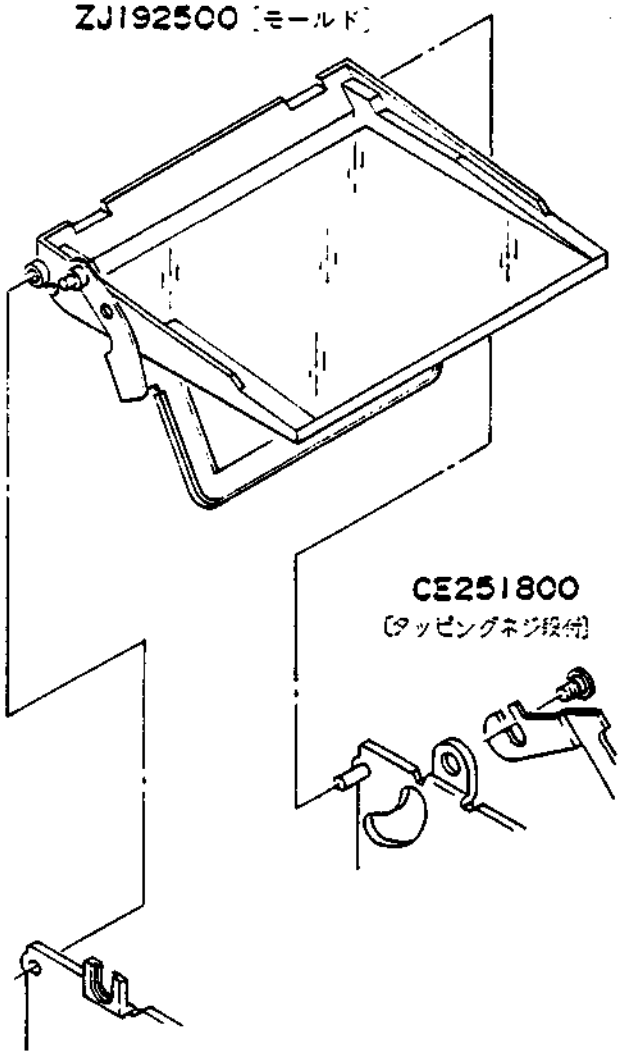
〈 2 〉

OLD

ZJ192500 〔モールド〕



NEW

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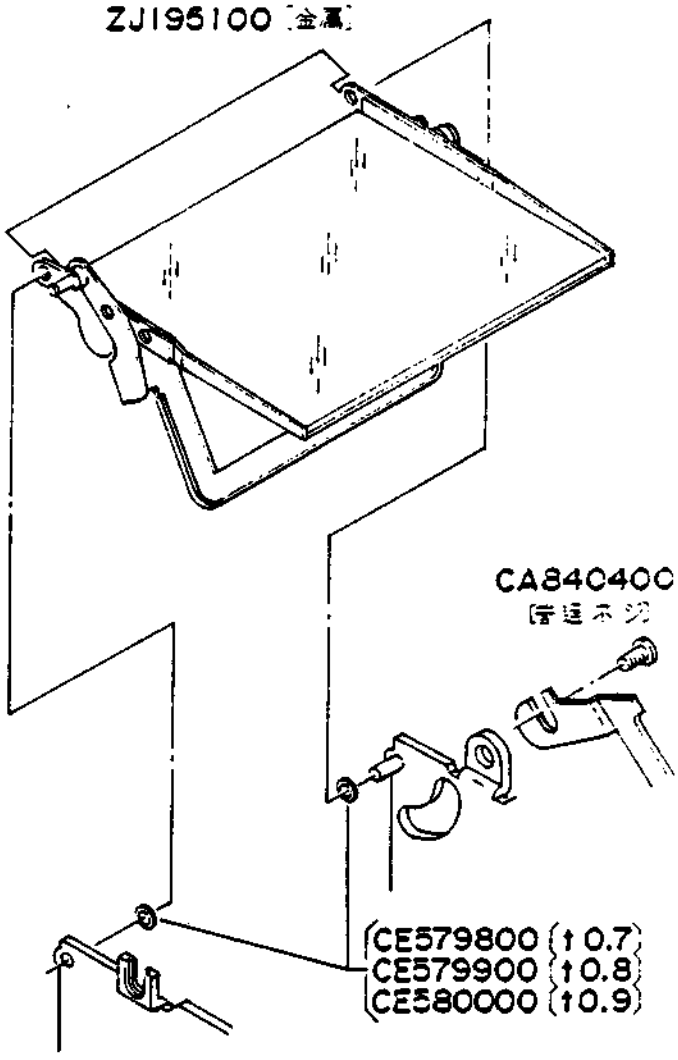
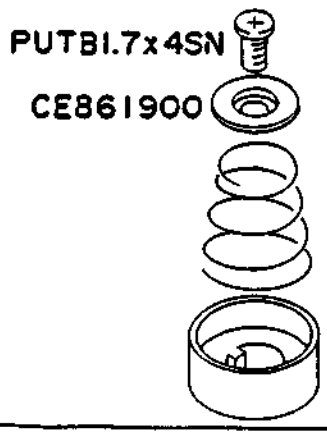
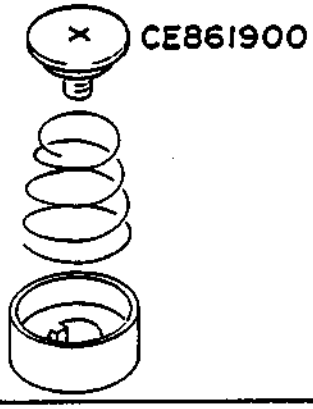


〈 3 〉

OLD



NEW